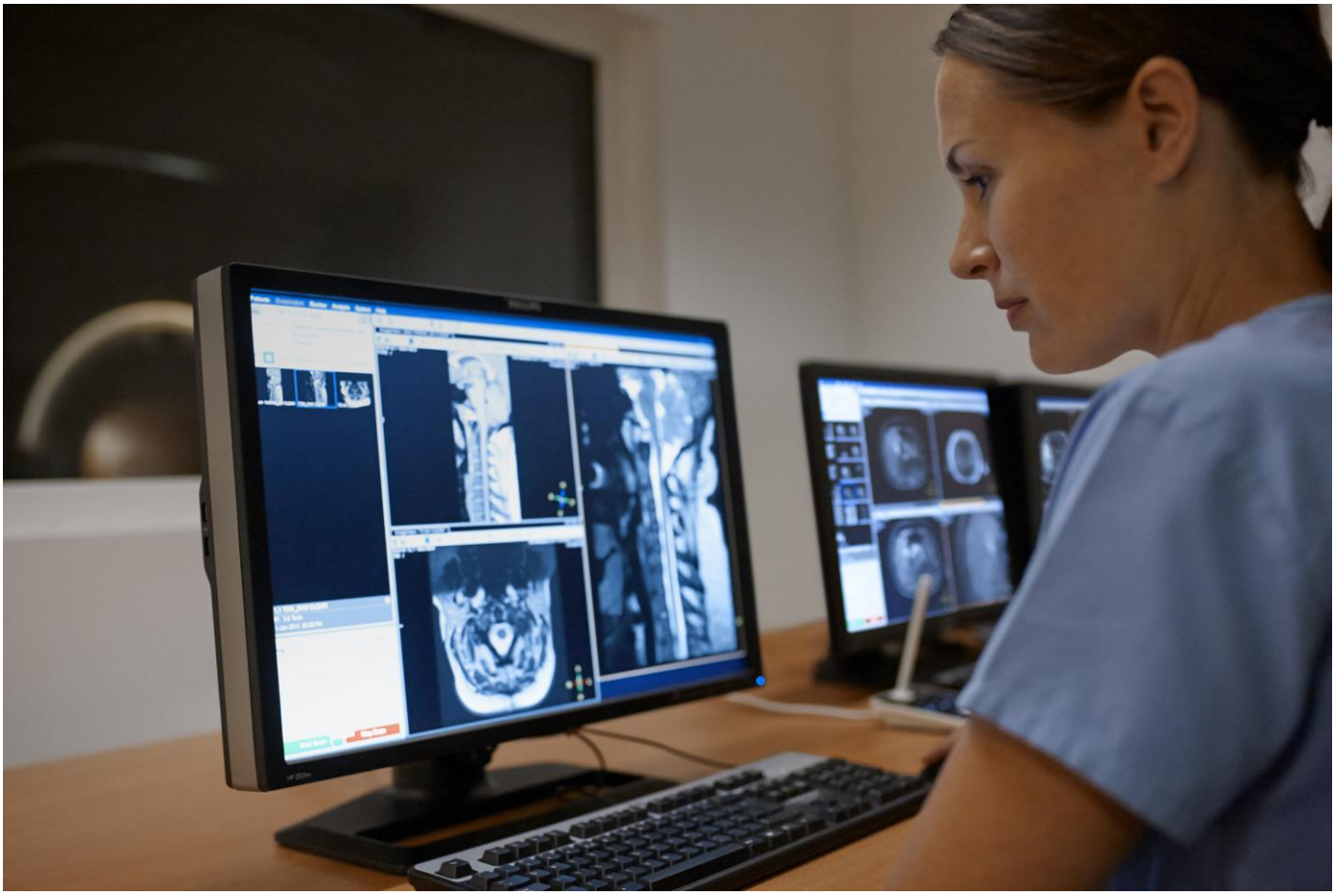
DICOM Conformance Statement

MR R3 - Achieva



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1. DICOM Conformance Statement Overview

This document is the DICOM Conformance Statement for MR Release 3 Systems later referred to as the MR System.
This document holds for the following:

- Achieva 1.5 and 3.0T

The system creates the DICOM Enhanced MR objects, CT Image, Enhanced MR Image, MR Spectroscopy and Raw Data. These objects can be sent and received. It depends on the capabilities of the remote system, which of these objects are supported in the transactions. The capabilities of the remote systems are locally stored on the MR System in configuration files per DICOM node. In case the remote system does not support Enhanced MR Images, the MR System will send the object as standard ('classic') MR Images.

The MR System is a modality that generates MR Images. It supports the following DICOM functionality:

- DICOM Verification service (for both SCU and SCP).
- Storage of DICOM objects on a remote DICOM system.
- Commitment of stored DICOM objects on a remote DICOM system (Push Model).
- Querying for data on a remote DICOM system.
- Retrieval of DICOM objects from a remote DICOM system.
- Basic Worklist Management (BWLM).
- Implementation of Modality Performed Procedure Step (MPPS).
- Storage and Retrieval of DICOM objects per removable media.
- Printing of hardcopies on a remote DICOM printer.
- Query for data by a remote DICOM system.

The MR system includes the Real World Value Macro information in the MR Image and Enhanced MR Image objects.
The information in the RWV attributes is consistent with the information in the Rescaling attributes, but might be differently scaled. Images of type APTW however contain pixels that have no Real World Value as expressed through the Real World Value First Value Mapped and Real World Value Last Value Mapped.
As a result a measurement that uses the Rescaling attributes might give a different value compared to the same measurement using the RWV attributes as not all Pixels might contribute to the measurement based on the real world values.

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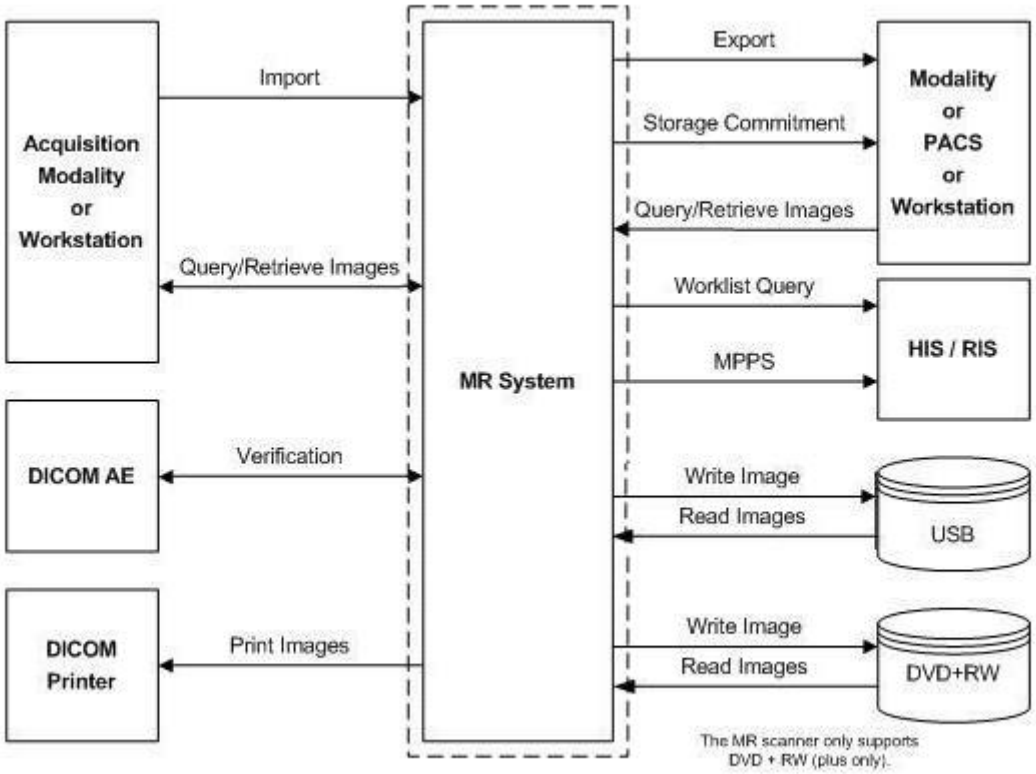

Figure 1: MR System in a DICOM network overview

Table 1: Network Services

SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Other			
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Print Management			
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No
Query/Retrieve			
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	Yes
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes
Transfer			
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Yes	Yes

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SOP Class		User of Service (SCU)	Provider of Service (SCP)
Name	**UID**		
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4	Yes	Yes
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	No
Workflow Management			
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No

In case a remote DICOM system supports both the Enhanced MR Image Storage SOP Class and the MR Image Storage SOP Class and on the MR system both SOP Classes are enabled, then the MR system holds a preference to send data in the Enhanced format.

MR system supports C-MOVE to a third system who's AE shall be configured on the MR system.The third system must be defined at the MR system. This kind of data transfer can be interpreted as data forwarding from a different location.

Table 2: Media Services

Media Storage Application Profile	File-set Creator (FSC)	File-set Updater (FSU)	File-set Reader (FSR)
DVD			
CT/MR Studies on DVD Media	Yes	No	Yes
USB			
General Purpose USB Media.	Yes	Yes	Yes

MR supports DVD (only DVD+RW) and USB devices for media storage.
Image compression is not supported. Finalization of the DVD will automatically be done after the burning process has finished.

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2. Table of Contents

1. DICOM CONFORMANCE STATEMENT OVERVIEW 3
2. TABLE OF CONTENTS 6
3. INTRODUCTION 9
3.1. REVISION HISTORY 9
3.2. AUDIENCE 9
3.3. REMARKS 9
3.4. DEFINITIONS, TERMS AND ABBREVIATIONS 10
3.5. REFERENCES 10
4. NETWORKING 11
4.1. IMPLEMENTATION MODEL 11
4.1.1. Application Data Flow 11
4.1.2. Functional Definition of AE's 12
4.1.2.1. Functional Definition of MR AE 12
4.1.2.2. Functional Definition of MR System Print 14
4.1.3. Sequencing of Real World Activities 14
4.1.3.1. Description of specific Sequencing of Integrated Workflow as performed by the MR AE 14
4.1.3.2. Description of specific Sequencing of Import Images per Query/Retrieve 15
4.2. AE SPECIFICATIONS 16
4.2.1. MR AE 16
4.2.1.1. SOP Classes 16
4.2.1.2. Association Policies 16
4.2.1.2.1. General 16
4.2.1.2.2. Number of Associations 17
4.2.1.2.3. Asynchronous Nature 17
4.2.1.2.4. Implementation Identifying Information 17
4.2.1.2.5. Communication Failure Handling 17
4.2.1.3. Association Initiation Policy 17
4.2.1.3.1. (Real-World) Activity – Verification as SCU 19
4.2.1.3.2. (Real-World) Activity – Modality worklist as SCU 20
4.2.1.3.3. (Real-World) Activity – Modality Performed Procedure Step as SCU 25
4.2.1.3.4. (Real-World) Activity – FIND as SCU 29
4.2.1.3.5. (Real-World) Activity – MOVE as SCU 33
4.2.1.3.6. (Real-World) Activity – Image Export 36
4.2.1.3.7. (Real-World) Activity – Storage Commitment Push Model as SCU 39
4.2.1.4. Association Acceptance Policy 42
4.2.1.4.1. (Real-World) Activity – Verification as SCP 43
4.2.1.4.2. (Real-World) Activity – FIND as SCP 45
4.2.1.4.3. (Real-World) Activity – MOVE as SCP 49
4.2.1.4.4. (Real-World) Activity – Image Import 51
4.2.2. MR System Print 55
4.2.2.1. SOP Classes 55
4.2.2.2. Association Policies 55
4.2.2.2.1. General 55
4.2.2.2.2. Number of Associations 55
4.2.2.2.3. Asynchronous Nature 55
4.2.2.2.4. Implementation Identifying Information 56
4.2.2.2.5. Communication Failure Handling 56
4.2.2.3. Association Initiation Policy 56
4.2.2.3.1. (Real-World) Activity – Print Management as SCU 57
4.2.2.4. Association Acceptance Policy 63
4.2.3. Physical Network Interfaces 63
4.2.4. Additional Protocols 63

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4.2.5. IPv4 and IPv6 Support 63
4.3. CONFIGURATION 63
4.3.1. AE Title/Presentation Address Mapping 63
4.3.1.1. Local Network settings 63
4.3.1.2. Local AE Titles and listen port 64
4.3.1.3. Remote AE Title/Presentation Address Mapping 64
4.3.2. Configurable parameters 64
5. MEDIA INTERCHANGE 67
5.1. IMPLEMENTATION MODEL 67
5.1.1. Application Data Flow Diagram 67
5.1.2. Functional Definitions of AE's 68
5.1.3. Sequencing of Real World Activities 68
5.2. AE SPECIFICATIONS 68
5.2.1. MR Media AE - Specification 68
5.2.1.1. File Meta Information for the MR Media AE 69
5.2.1.2. Real-World Activities 69
5.2.1.2.1. RWA - Read File-set 69
5.2.1.2.2. RWA - Create File-set 70
5.2.1.2.3. RWA - Update File-set 70
5.3. AUGMENTED AND PRIVATE APPLICATION PROFILES 71
5.4. MEDIA CONFIGURATION 71
6. SUPPORT OF CHARACTER SETS 72
7. SECURITY 74
7.1. SECURITY PROFILES 74
7.1.1. Security use Profiles 74
7.1.2. Security Transport Connection Profiles 74
7.1.3. Digital Signature Profiles 74
7.1.4. Media Storage Security Profiles 74
7.1.5. Attribute Confidentiality Profiles 74
7.1.6. Network Address Management Profiles 76
7.1.7. Time Synchronization Profiles 76
7.1.8. Application Configuration Management Profiles 76
7.1.9. Audit Trail Profiles 76
7.2. ASSOCIATION LEVEL SECURITY 76
7.3. APPLICATION LEVEL SECURITY 76
8. ANNEXES OF APPLICATION "MR SYSTEM NETWORK AE" 79
8.1. IOD CONTENTS 79
8.1.1. Created SOP Instance 79
8.1.1.1. List of created SOP Classes 79
8.1.1.2. CT Image Storage SOP Class 80
8.1.1.3. Enhanced MR Image Storage SOP Class 84
8.1.1.4. MR Image Storage SOP Class 97
8.1.1.5. MR Spectroscopy Storage SOP Class 103
8.1.1.6. Raw Data Storage SOP Class 114
8.1.1.7. Secondary Capture Image Storage SOP Class 117
8.1.1.8. Grayscale Softcopy Presentation State Storage SOP Class 121
8.1.1.9. Media Storage Directory SOP Class 127
8.1.2. Attribute Mapping 128
8.1.3. Coerced/Modified fields 129
8.2. DATA DICTIONARY OF PRIVATE ATTRIBUTES 130
8.3. CODED TERMINOLOGY AND TEMPLATES 130
8.3.1. Context Groups 130
8.3.2. Template Specifications 130
8.3.3. Private code definitions 130

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8.4. GRAYSCALE IMAGE CONSISTENCY 130
8.5. STANDARD EXTENDED/SPECIALIZED/PRIVATE SOPS 130
8.5.1. Standard Extended/Specialized/Private SOP Instance 131
8.5.1.1. CT Image Storage SOP Class 131
8.5.1.2. Enhanced MR Image Storage SOP Class 135
8.5.1.3. MR Image Storage SOP Class 136
8.5.1.4. MR Spectroscopy Storage SOP Class 140
8.5.1.5. Raw Data Storage SOP Class 141
8.5.1.6. Secondary Capture Image Storage SOP Class 143
8.5.1.7. Grayscale Softcopy Presentation State Storage SOP Class 144
8.5.1.8. Media Storage Directory SOP Class 145
8.6. PRIVATE TRANSFER SYNTAXES 145

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3. Introduction

3.1. Revision History

The revision history provides dates and differences of the different releases.

Table 3: Revision History

Document Version	Date of Issue	Status	Description
00	26-July-2017	Authorized	Final version

3.2. Audience

This Conformance Statement is intended for:

- (Potential) customers
- System integrators of medical equipment
- Marketing staff interested in system functionality
- Software designers implementing DICOM interfaces

It is assumed that the reader is familiar with the DICOM standard.

3.3. Remarks

The DICOM Conformance Statement is contained in chapter 4 through 8 and follows the contents and structural requirements of DICOM PS 3.2.
This DICOM Conformance Statement by itself does not guarantee successful interoperability of Philips equipment with non-Philips equipment. The user (or user's agent) should be aware of the following issues:

- **Interoperability**
  Interoperability refers to the ability of application functions, distributed over two or more systems, to work successfully together. The integration of medical devices into an IT environment may require application functions that are not specified within the scope of DICOM. Consequently, using only the information provided by this Conformance Statement does not guarantee interoperability of Philips equipment with non-Philips equipment.
  It is the user's responsibility to analyze thoroughly the application requirements and to specify a solution that integrates Philips equipment with non-Philips equipment.

- **Validation**
  Philips equipment has been carefully tested to assure that the actual implementation of the DICOM interface corresponds with this Conformance Statement.
  Where Philips equipment is linked to non-Philips equipment, the first step is to compare the relevant Conformance Statements. If the Conformance Statements indicate that successful information exchange should be possible, additional validation tests will be necessary to ensure the functionality, performance, accuracy and stability of image and image related data. It is the responsibility of the user (or user's agent) to specify the appropriate test suite and to carry out the additional validation tests.

- **New versions of the DICOM Standard**
  The DICOM Standard will evolve in future to meet the user's growing requirements and to incorporate new features and technologies. Philips is actively involved in this evolution and plans to adapt its equipment to future versions of the DICOM Standard. In order to do so, Philips reserves the right to make changes to its products or to discontinue its delivery. The user should ensure that any non-Philips provider linking to Philips equipment also adapts to future versions of the DICOM Standard. If not, the incorporation of DICOM enhancements into Philips equipment may lead to loss of connectivity (in case of networking) and incompatibility (in case of media).

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3.4. Definitions, Terms and Abbreviations

Table 4: Definitions, Terms and Abbreviations

Abbreviation/Term	Explanation
ACSE	Association Control Service Element
AE	Application Entity
AP	Application Profile
CD	Compact Disc
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
EBE	DICOM Explicit VR Big Endian
ELE	DICOM Explicit VR Little Endian
FSC	File-set Creator
PSC	Philips Support Connect
FSR	File-set Reader
FSU	File-set Updater
GUI	Graphic User Interface
ILE	DICOM Implicit VR Little Endian
IOD	Information Object Definition
MPPS	Modality Performed Procedure Step
MR	Magnetic Resonance
NEMA	National Electrical Manufacturers Association
PDU	Protocol Data Unit
PDU	Protocol Data Units
RIS	Radiology Information System
RQ	Request
RSP	Response
RWA	Real-World Activity
SC	Secondary Capture
SCM	Study Component Management
SCP	Service Class Provider
SCU	Service Class User
SOP	Service Object Pair
TCP/IP	Transmission Control Protocol/Internet Protocol
UID	Unique Identifier
UL	Upper Layer
WLM	Worklist Management

3.5. References

[DICOM] Digital Imaging and Communications in Medicine, Parts 1 - 20 (NEMA PS 3.1- PS 3.20),
National Electrical Manufacturers Association (NEMA)
Publication Sales 1300 N. 17th Street, Suite 1752 Rosslyn, Virginia. 22209, United States of America
Internet: http://medical.nema.org/

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4. Networking

4.1. Implementation model

The implementation model consists of three sections:

- The application data flow diagram, specifying the relationship between the Application Entities and the "external world" or Real-World Activities,
- A functional description of each Application Entity, and
- The sequencing constraints among them.

4.1.1. Application Data Flow

The MR System incorporates two networking Application Entities (AE). The related networking application data flow as a functional overview of the MR system is shown in Figure 2:

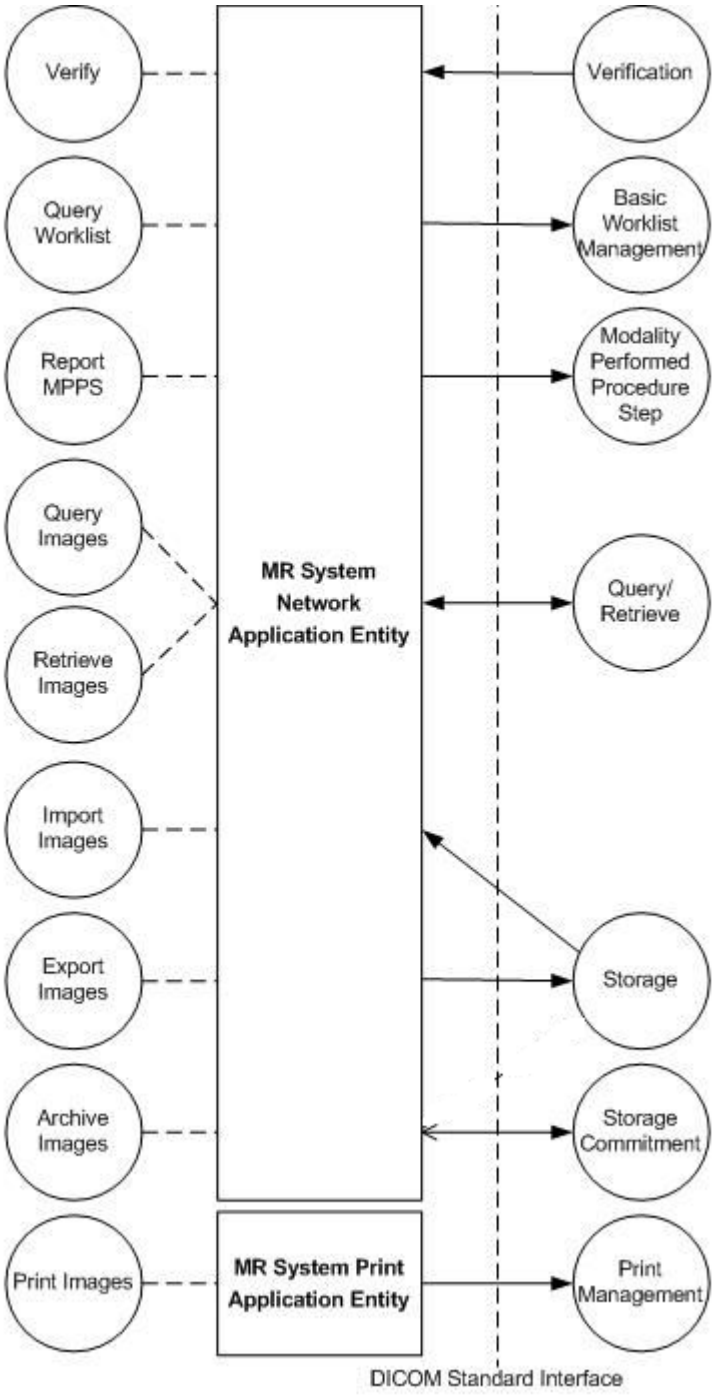

Figure 2: MR System AE Data Flow Diagram

4.1.2. Functional Definition of AE's

This section contains a functional definition for each individual local Application Entity.

4.1.2.1. Functional Definition of MR AE

The MR System Network AE as Verification SCP implements the RWA Verify to handle verification requests.

Query Worklist

The MR System Network AE as Basic Worklist Management SCU implements the RWA Query Worklist to request the worklist from a

DICOM Radiology Information System (RIS).
The function is initiated on the MR System by clicking the “RIS” button. After receiving the worklist data from the RIS the MR System will display the worklist on the user interface.
After selection of the relevant patient record the received patient data is displayed. The tags Performed Procedure Step Start Date – 0x00400244 and Performed Procedure Step Start Time- 0x00400245 are modified to the current date and time before the patient data is stored in the local database.

Report MPPS
The MR System Network AE as SCU implements the RWA Report MPPS to create and update a Modality Performed Procedure Step object.
The RWA is initiated at the start of the first scan of a new examination to inform the DICOM Radiology Information System (RIS) (status “IN-PROGRESS”).
When the image object has been acquired and archived one may click the "Ready" button when the MPPS is completed or the "Incomplete" button if the MPPS is discontinued. The MR System Network AE will send a new MPPS notification with the status “COMPLETED” or “DISCONTINUED”.

Query Images
The MR System Network AE as Query/Retrieve SCU implements the RWA Query Images to find Examinations on a remote system (e.g. PACS).

Retrieve Images
The MR System Network AE as Query/Retrieve SCU implements the RWA Retrieve Images to initiate MOVE of selected objects from a remote system (e.g. PACS).
The MR System Network AE as Query/Retrieve SCP implements the RWA Retrieve Images to move selected objects to another DICOM node.

Import Images
The MR System Network AE as Storage SCP implements the RWA Import Images to store images and related objects from a remote archive using the relevant storage SOP classes.
The MR System Network AE will respond to a remote request and store the images in the patient database. DICOM instances (Secondary Capture, original Grayscale Softcopy Presentation State, MR images from a Philips MR System and Private Philips MR SOP classes) may be imported for reference purposes only; when these are exported again then consistency and completeness cannot be guaranteed.

Export Images
The MR System Network AE as Storage SCU implements the RWA Export Images to store images and related object data on a remote system using the relevant storage SOP classes.
The acquired images and object data, as selected per Examinations, can be sent to a selected remote system, either manually or automatically.
The MR System can be configured to send Grayscale Softcopy Presentation State data for the selected Images.
By default a large amount of information is stored in private attributes of the exported images and related objects. When modifying/processing those images such application is responsible for data consistency and therefore should use the private data elements with caution. Note that the MR System can be configured to export DICOM objects without private attributes. These images cannot be imported anymore on the MR scanner.

- **Splitting series into different dimensions**
  In the PSC of the MR system DICOM templates are present that can be used to split series on export from the MR system to a remote system. Parameters for series splitting are: echo, Phases, Image Types, dynamic and diffusion b-value. Only one dimension can be split in order of priority.
  Note that when several related split series are imported again from a remote node, these will be combined again into one series.
- **Converting images with color to color Secondary Capture images**
  In the PSC of the MR system a DICOM template is present that can be used to configure a network node to *not* create the next behavior. Convert Grayscale images with a COLOR LUT to Color Secondary Capture images during export.
  For nodes supporting the Enhanced MR SOP class the images will not be converted as the Enhanced MR SOP class is supporting the COLOR LUT information.
  Note that the conversion to Color Secondary Capture images cannot be reversed. MR color images as generated in the Fiber Tracking application are also converted to Color Secondary Capture images during export.
  This conversion is however reversed when these images are imported.

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Archive Images
The MR System Network AE implements the RWA Archive Images to store (as Storage SCU) and, if configured, commit (as Storage Commitment SCU) images on the configured remote archive (e.g. PACS) using the Storage and Storage Commitment Push Model SOP class.
After sending a series of images to the archive, the MR System will request a storage commitment from this archive for all exported images and related objects. The storage commitment status is indicated in the Patient Administration User Interface.
Deleting image(s) is/are independent of commitment from the PACS on the local MR system.

4.1.2.2. Functional Definition of MR System Print

The MR System Print AE as Print Management SCU implements the RWA Print Images to send and print images on a DICOM network printer using the Basic Grayscale Print Management Meta SOP class.
After selecting the images, these can be sent to a DICOM network printer.

4.1.3. Sequencing of Real World Activities

4.1.3.1. Description of specific Sequencing of Integrated Workflow as performed by the MR AE

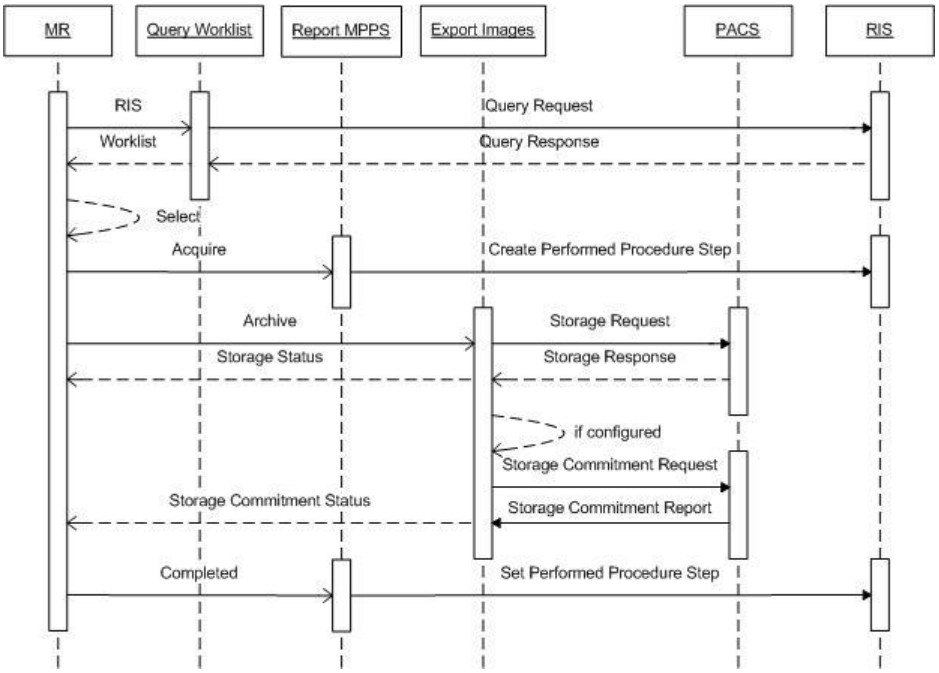

Figure 3: Sequencing of Integrated Workflow

Figure 3 shows a typical example of an integrated workflow (using a single acquisition, a single storage with commitment, without pre-fetching).

The MR System workflow is initiated by clicking the “RIS” button. After receiving the worklist, data from the RIS the MR System will display the worklist on the user interface.

Then one may select a relevant patient record and add missing data or modify restricted set of data only (as specified) before the received patient data is stored in the local database.
At the start and at the end of the acquisition/processing the configured MPPS system (RIS) is informed of the progress of the selected procedure step.

Before or after an acquisition a remote system can send related images of one or more of the scheduled patients to the MR System (pre-fetching, for reference only).

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The created images are converted into a DICOM objects that can be sent to the remote system, or can be written on a DVD or local disk. After storage in a remote archive the MR System will request a storage commitment (as configured).

Note that, if no RIS is configured or no connection is possible, data can be entered manually via the user interface.

After preparation of the scanner and the patient, the operator will perform the requested or locally planned procedure steps. Results may be MR images, Presentation State objects, object and screen-grabs stored as Secondary Capture images, MR Spectroscopy and Private Philips MR Series Data, images and other related objects; and data about the scan protocol and examcard data.

4.1.3.2. Description of specific Sequencing of Import Images per Query/Retrieve

Figure 4 shows a typical example of a sequence for import of a series of images per Query/Retrieve (e.g. pre-fetching).

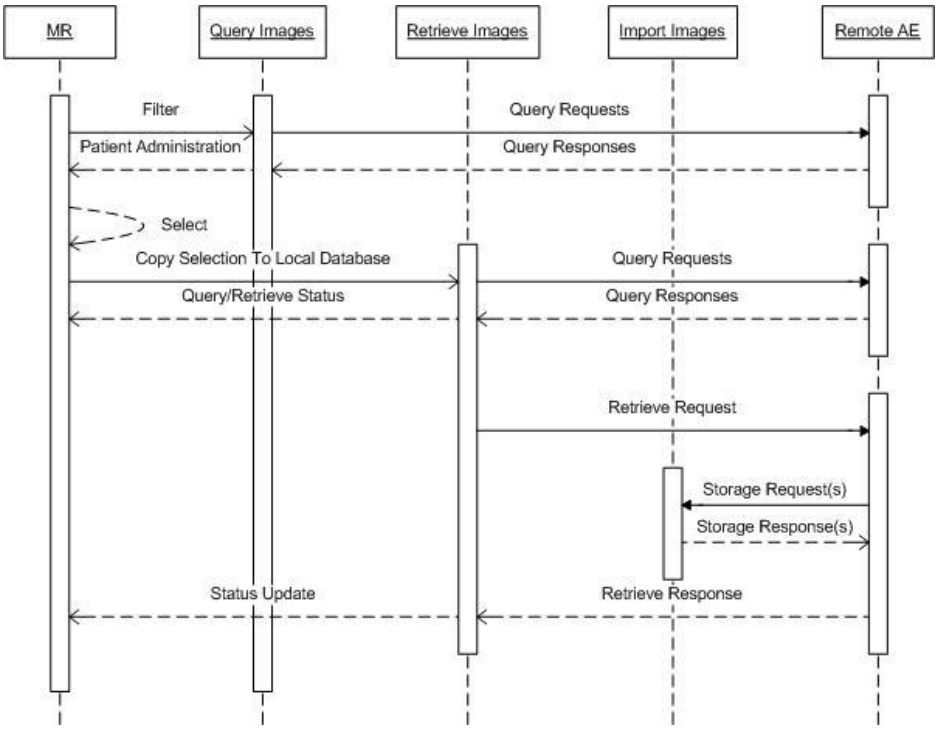

Figure 4: Sequencing of import Images per Query/Retrieve

The MR System sends initial query requests to the remote AE to find all Examinations matching the specified filter.
After selecting the Examinations to be retrieved the copy selection to local database is initiated. New query requests are sent to find the Series related to the selected Examinations. This is followed by retrieve requests to the remote AE to move all required Series of Images. Then for each retrieve request the remote AE will store the related Images on the MR System.
Query/Retrieve as SCP is supported by MR system. Note that the parameter “Allow Incoming Queries” needs to be enabled in the Service Application of the MR system.

Modality MR supports sending C-MOVE-RQ messages with a move destination (AE title) other than itself. This allows MR to initiate storage from a remote system to itself or to another remote system. This remote system must be defined on the MR system as destination.

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4.2. AE Specifications

This section in the DICOM Conformance Statement is a set of Application Entity specifications. There are as many of these subsections as there are different AE's in the implementation.

4.2.1. MR AE

Detail of this specific Application Entity is specified in this section.

4.2.1.1. SOP Classes

This MR Application Entity provides Standard Conformance to the SOP Classes mentioned in Table 5.

Table 5: SOP Classes for MR AE

SOP Class Name	SOP Class UID	SCU	SCP
Verification SOP Class	1.2.840.10008.1.1	Yes	Yes
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Yes	No
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Yes	No
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Yes	Yes
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Yes	No
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Yes	Yes
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1	Yes	Yes
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2	Yes	Yes
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Yes	Yes
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Yes	Yes
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Yes	Yes
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Yes	Yes
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Yes	Yes
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Yes	Yes
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Yes	No
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Yes	Yes
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Yes	Yes
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4	Yes	Yes

MR Series can be exported either as Enhanced MR Image Storage or as ‘classic’ MR Images Storage. If both are supported by the destination, the Enhanced MR Image storage is preferred.
This is configurable via PSC.

Note:

- RAW Data Storage is used to store MR Series Data and MR Examcard data if this is supported by the destination even if the Philips private SOP classes are supported.
- Any SOP specific behavior is documented later in the conformance statement in the applicable SOP specific conformance section.

4.2.1.2. Association Policies

Each AE specification contains a description of the general association establishment and acceptance policies of the AE.

4.2.1.2.1. General

The DICOM standard application context is specified in Table 6.

Table 6: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.1.2.2. Number of Associations

The number of simultaneous associations that an Application Entity may support as an Initiator or Acceptor is specified in Table 7 and Table 8.

Table 7: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	4 (fixed)

Table 8: Number of associations as an Association Acceptor for this AE

Description	Value
Maximum number of simultaneous incoming associations	Configurable, default = 4

4.2.1.2.3. Asynchronous Nature

The MR System Network AE supports asynchronous operations only for Storage Commitment, and does not negotiate other asynchronous operation windows. When a synchronous Storage Commitment times out, it automatically becomes an asynchronous Storage Commitment.

4.2.1.2.4. Implementation Identifying Information

The value supplied for Implementation Class UID and version name are documented in Table 9.

Table 9: DICOM Implementation Class and Version for MR AE

Implementation Class UID	1.3.46.670589.11.0.0.51.4.54.0
Implementation Version Name	Philips MR 54.0

4.2.1.2.5. Communication Failure Handling

The behavior of the AE during communication failure is summarized in the next table.

Table 10: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	Association setup failed and is closed. The reason is logged and reported to the user.

4.2.1.3. Association Initiation Policy

The MR AE initiates associations as a result of the following events:
-The operator or a remote (Query/Retrieve) application copies selected images from the MR System.
-The operator requests to print selected images of the MR system database.
-The operator queries a remote database.
-The operator copies selected images from a remote database to another database.
-The archive requests storage commitment of images on a remote database.
The possible Reject Responses during Association are shown in Table 11.

Table 11: Association Rejection response

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	The user will be informed. The information is logged in central log file.
		2 - application-context-name-not supported	The user will be informed. The information is logged in central log file.

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Result	Source	Reason/Diagnosis	Behavior
		3 - calling-AE-title-not-recognized	The user will be informed. The information is logged in central log file.
		7 - called-AE-title-not-recognized	The user will be informed. The information is logged in central log file.
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	The user will be informed. The information is logged in central log file.
		2 - protocol-version-not-supported	The user will be informed. The information is logged in central log file.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	The user will be informed. The information is logged in central log file.
		2 - local-limit-exceeded	The user will be informed. The information is logged in central log file.
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	The user will be informed. The information is logged in central log file.
		2 - application-context-name-not-supported	The user will be informed. The information is logged in central log file.
		3 - calling-AE-title-not-recognized	The user will be informed. The information is logged in central log file.
		7 - called-AE-title-not-recognized	The user will be informed. The information is logged in central log file.
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	The user will be informed. The information is logged in central log file.
		2 - protocol-version-not-supported	The user will be informed. The information is logged in central log file.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	The user will be informed. The information is logged in central log file.
		2 - local-limit-exceeded	The user will be informed. The information is logged in central log file.

The possible association Abort Responses is listed in Table 12.

Table 12: Association Abort Handling

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	When received, the Network AE terminates the connection and logs the event. This is Sent when: - There are problems in SCU/SCP role negotiation. - Any other problem than the ones specified for the MR System as SCU in the rows below. - When received, the Network AE terminates the connection and logs the event.
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the Network AE terminates the connection and logs the event. This is Sent when: - There are problems in SCU/SCP role negotiation. - Any other problem than the ones specified for the MR System as SCU in the rows below.
	1 - unrecognized-PDU	When received, the Network AE terminates the connection and logs the event. This is Sent when: - An unrecognized PDU type is received.
	2 - unexpected-PDU	When received, the Network AE terminates the connection and logs the event. This is Sent when: - The received PDU type is not expected in the current state of connection.
	4 - unrecognized-PDU-parameter	When received, the Network AE terminates the connection and logs the event. This is Sent when: - An unrecognized Associate PDU item is received.

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Source	Reason/Diagnosis	Behavior
	5 - unexpected-PDU-parameter	When received, the Network AE terminates the connection and logs the event. This is Sent when: - One of the Associate PDU items is received more than once. - One of the Associate PDU items is received unexpectedly.
	6 - invalid-PDU-parameter-value	When received, the Network AE terminates the connection and logs the event. This is Sent when: - One of the Associate PDU items is received more than once. - One of the Associate PDU items is not received. There is mismatch in the application context names between the SCU and the SCP. - Illegal Asynchronous Operations Window invoke value is received. - Illegal Asynchronous Operations Window perform value is received. - Unknown presentation context id is received. Unknown abstract syntax is received. - The length or the format of a received PDU item is invalid.

4.2.1.3.1. (Real-World) Activity – Verification as SCU

4.2.1.3.1.1. Description and Sequencing of Activities

As defined by the MR System RWA Verify, the Network AE acts as a Verification SCP for any remote Verification SCU.

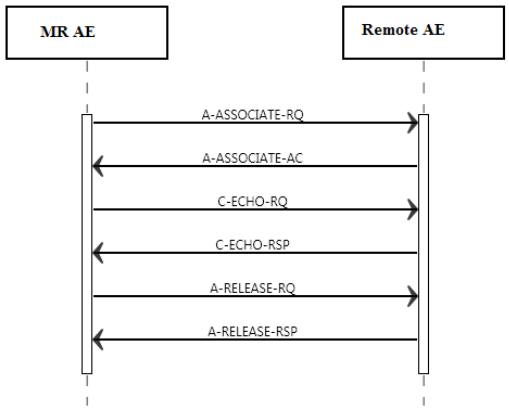

Figure 5: Sequencing of Verify

The Network AE accepts associations to verify application level communication using the C-ECHO command.

4.2.1.3.1.2. Proposed Presentation Contexts

The presentation contexts for Verification are defined in Table 13.

Table 13: Proposed Presentation Contexts for (Real-World) Activity – Verification as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		

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The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE and is chosen in case multiple Transfer Syntaxes are proposed in the Association Negotiation.
The MR System Network AE can accept multiple proposed Presentation Contexts with the same SOP class but different Transfer Syntaxes.
There is no check for duplicate contexts and these will therefore be accepted by MR. No extended negotiations supported by MR System Network AE.

4.2.1.3.1.3. SOP Specific Conformance for Verification SOP Class

4.2.1.3.1.3.1. Dataset Specific Conformance for Verification C-ECHO SCU

The Dataset Specific Response behavior is as shown in the Table 14.

Table 14: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Confirmation	Message in log file.

4.2.1.3.2. (Real-World) Activity – Modality worklist as SCU

4.2.1.3.2.1. Description and Sequencing of Activities

The MR System RWA Query Worklist may be used to provide or update the worklist for the MR System.

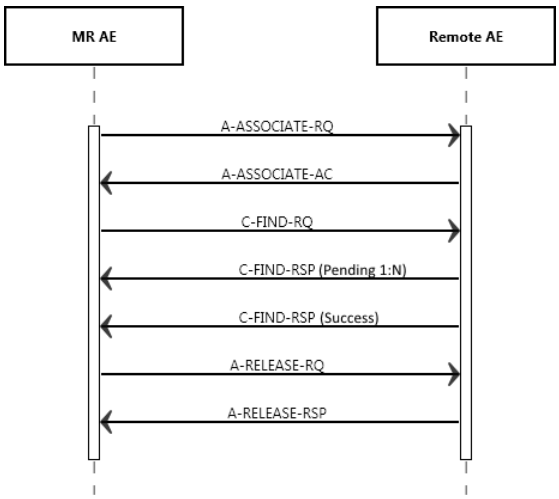

Figure 6: Sequencing of Query Worklist

The Query Worklist function is accessible through the MR System user interface. An association will be initiated to the configured remote system (typically a RIS) to send the worklist query. The RIS processes the query and returns the Worklist to the MR scanner. After receiving the Worklist the association will be released.

4.2.1.3.2.2. Proposed Presentation Contexts

The proposed presentation contexts for Modality Worklist as SCU are defined in the Table 15.

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Table 15: Proposed Presentation Contexts for (Real-World) Activity – Modality worklist as SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Modality Worklist Information Model - FIND SOP Class	1.2.840.10008.5.1.4.31	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.

4.2.1.3.2.3. SOP Specific Conformance for Modality Worklist Information Model - FIND SOP Class

The MR System provides the RIS dialog to enter criteria for the matching keys. The use of specific character set is as specified in chapter 6, Support of Character Sets. Table 16 lists the attributes that are shown in the “New Exam” dialog and the “More” dialog, providing the mapping of the DICOM attribute to the UI entry.

Table 16: Mapping between UI Fields and DICOM Attributes for New Exam.

UI Entry	DICOM Element Name	DICOM Element Tag	Exam Entry Editable	
			Manual	**RIS**
Examination				
Accession number	Accession Number	(0008,0050)	Yes	No
Referring Physician	Referring Physician's Name	(0008,0090)	Yes	No
Performing Physician	Performing Physician	(0008,1050)	Yes	Yes
Patient’s name	Patient's Name	(0010,0010)	Yes	No
Registration ID	Patient ID	(0010,0020)	Yes	No
	Other Patient IDs	(0010,1000)	Yes	No
Date of birth	Patient’s Birth Date	(0010,0030)	Yes	Yes*
Sex	Patient's Sex	(0010,0040)	Yes	No
Patient weight	Patient’s Weight	(0010,1030)	Yes	Yes
	Scheduled Procedure Step Sequence	(0040,0100)	No	No
Exam name	> Scheduled Procedure Step Description	(0040,0007)	Yes	Yes
Exam date	Study Date	(0008,0020)	Yes	Yes
	Performed Procedure Step Start Date	(0040,0244)	Yes	Yes
	Performed Procedure Step End Date	(0040,0250)	Yes	Yes
Comments	Study Comments	(0032,4000)	Yes	Yes
	Comments on the Performed Procedure Step	(0040,0280)	Yes	Yes
Implant	Metal Implant Status	(2005,1578)	Yes	Yes
Allowed SAR Mode	SAR Operation Mode	(2005,1581)	Yes	Yes
PIIM_MAX_SAR	MaxSAR	2005,1575	Yes	No
PIIM_MAX_DB_DT	MaxDbDt	2005,1574	Yes	No
PIIM_MR_STUDY_B1RMS	MRStudyB1rms	2005,1587	Yes	No
General Worklist (RIS)				
Medical Alerts	Medical Alerts	(0010,2000)	Yes	No
Allergies	Contrast Allergies	(0010,2110)	Yes	No
Pregnancy Status	Pregnancy Status	(0010,21C0)	Yes	No
Requested Procedure	Requested Procedure Code Sequence	(0032,1064)	No	No
Code Value	> Code Value	(0008,0100)	No	No

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UI Entry	DICOM Element Name	DICOM Element Tag	Exam Entry Editable	
			Manual	RIS
Code Scheme Designator	> Coding Scheme Designator	(0008,0102)	No	No
Code Scheme Version	>Coding Scheme Version	(0008,0103)	No	No
Code Meaning	> Code Meaning	(0008,0104)	No	No
Procedure ID	Requested Procedure ID	(0040,1001)	No	No
Comments	Requested Procedure Comments	(0040,1400)	No	No
Procedure Step Description	> Scheduled Procedure Step Description	(0040,0007)	No	No
Scheduled Procedure Step				
	Scheduled Procedure Step Sequence	(0040,0100)	No	No
Modality	> Modality	(0008,0060)	No	No
	> Scheduled Procedure Step Start Date	(0040,0002)	No	No
	> Scheduled Procedure Step Start Time	(0040,0003)	No	No
	> Scheduled Protocol Code Sequence	(0040,0008)	No	No
Code Value	>> Code Value	(0008,0100)	No	No
Coding Scheme Designator	>> Coding Scheme Designator	(0008,0102)	No	No
Code Scheme Version	>> Coding Scheme Version	(0008,0103)	No	No
Code Meaning	>> Code Meaning	(0008,0104)	No	No
Procedure Step Description	> Scheduled Procedure Step Description	(0040,0007)	No	No
Procedure Step ID	> Scheduled Procedure Step ID	(0040,0009)	No	No
Pre-Medication	> Pre-Medication	(0040,0012)	No	No
Comments	> Comments on the Scheduled Procedure Step	(0040,0400)	No	No
Performed Procedure Step				
	Performed Protocol Code Sequence	(0040,0260)	No	No
Code Value	>> Code Value	(0008,0100)	Yes	Yes
Coding Scheme Designator	>> Coding Scheme Designator	(0008,0102)	Yes	Yes
Code Scheme Version	>> Coding Scheme Version	(0008,0103)	Yes	Yes
Code Meaning	>> Code Meaning	(0008,0104)	Yes	Yes
Comments	Study Comments	(0032,4000)	Yes	Yes
	Comments on the Performed Procedure Step**	(0040,0280)	Yes	Yes

*Date of birth is editable only if it comes empty from the RIS.
**Comments on the Performed Procedure Step are copied from the Comments on scheduled procedure Step.

4.2.1.3.2.3.1. Dataset Specific Conformance for Modality Worklist Information Model - FIND SOP Class C-FIND-SCU

Table 17 should be read as follows:

Attribute Name: Attributes supported to build a Modality Worklist Request Identifier.
Tag: DICOM tag for this attribute.
VR: DICOM VR for this attribute.
M: Matching Keys for (automatic) Worklist Update.
R: Return Keys. An "X" indicates that this attribute as matching key can be used.
Q: Interactive Query Key. An "X" indicates that this attribute as matching key can be used.
D: Displayed Keys. An "X" indicates that this attribute is displayed when registering a new patient in the New Exam window.
IOD: An "X" indicates that this attribute is included in all exported images after execution of the related Procedure Step.
Type of matching: The following types of matching exists:
Single Value Matching
List of UID Matching
Wild Card Matching
Range Matching
Sequence Matching
Universal Matching

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Table 17: Worklist Request Identifier

Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
Patient Identification Module									
Other Patient IDs	0010,1000	LO		X			X		
Patient's Name	0010,0010	PN	X	X			X		
Patient ID	0010,0020	LO	X	X			X	Universal	Registration ID in UI
Patient Demographic Module									
Ethnic Group	0010,2160	SH		X			X		
Patient Comments	0010,4000	LT		X			X		
Patient's Birth Date	0010,0030	DA		X		X	X	Universal	
Patient's Sex	0010,0040	CS		X		X	X		
Patient's Weight	0010,1030	DS		X		X	X		
Patient Medical Module									
Additional Patient History	0010,21B0	LT		X			X		
Allergies	0010,2110	LO		X		X	X		
Medical Alerts	0010,2000	LO		X		X	X		
Pregnancy Status	0010,21C0	US		X		X	X		
Visit Status Module									
Current Patient Location	0038,0300	LO		X					
SOP Common Module									
Specific Character Set	0008,0005	CS		X			X		Required if expanded/replacement character set used.
Scheduled Procedure Step Module									
Scheduled Procedure Step Sequence	0040,0100	SQ		X					
>Comments on the Scheduled Procedure Step	0040,0400	LT		X		X			
>Modality	0008,0060	CS	X	X	X	X	X	Single Value	Select * or MR. Default value is empty
>Pre-Medication	0040,0012	LO		X		X			
>Requested Contrast Agent	0032,1070	LO		X					
>Scheduled Performing Physician's Name	0040,0006	PN		X		X	X		
>Scheduled Procedure Step Description	0040,0007	LO		X		X	X		
>Scheduled Procedure Step End Date	0040,0004	DA		X	X	X	X	Single Value	UI requires positive number of days excluding today Ex. 1
>Scheduled Procedure Step End Time	0040,0005	TM		X			X		
>Scheduled Procedure Step ID	0040,0009	SH		X		X	X		
>Scheduled Procedure Step Location	0040,0011	SH		X					
>Scheduled Procedure Step Start Date	0040,0002	DA	X	X	X	X	X	Single Value	UI requires positive number of days including today. Ex 1
>Scheduled Procedure Step Start Time	0040,0003	TM		X			X		
>Scheduled Procedure Step Status	0040,0020	CS		X					
>Scheduled Station AE Title	0040,0001	AE	X	X		X		Single Value	Select one of the configured AE Titles. Default value is the local AE Title.
>Scheduled Station Name	0040,0010	SH		X					
>Scheduled Protocol Code Sequence	0040,0008	SQ		X			X		
>>Code Meaning	0008,0104	LO		X		X	X		
>>Code Value	0008,0100	SH		X		X	X		

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Attribute Name	Tag	VR	M	R	Q	D	IOD	Type of Matching	Comment
>>Coding Scheme Designator	0008,0102	SH		X		X	X		
>>Coding Scheme Version	0008,0103	SH		X		X	X		
Requested Procedure Module									
Names of Intended Recipients of Results	0040,1010	PN		X					
Requested Procedure Comments	0040,1400	LT		X		X	X		
Requested Procedure Description	0032,1060	LO		X		X	X		
Requested Procedure ID	0040,1001	SH	X	X		X	X		
Study Instance UID	0020,000D	UI		X			X		
Referenced Study Sequence	0008,1110	SQ		X			X		
>Referenced SOP Class UID	0008,1150	UI		X			X		
>Referenced SOP Instance UID	0008,1155	UI		X			X		
Requested Procedure Code Sequence	0032,1064	SQ		X					
>Code Meaning	0008,0104	LO		X		X			
>Code Value	0008,0100	SH		X		X			
>Coding Scheme Designator	0008,0102	SH		X		X			
>Coding Scheme Version	0008,0103	SH		X		X			
> Mapping Resource	0008,0105	CS							
>Context Group Version	0008,0106	DT							
>Context Group Local Version	0008,0107	DT							
>Context Group Extension Creator UID	0008,010D	UI							
Imaging Service Request Module									
Accession Number	0008,0050	SH	X	X	X	X	X	Single Value	Any value, Default value is empty.
Imaging Service Request Comments	0040,2400	LT		X					
Referring Physician's Name	0008,0090	PN		X		X	X		
Requesting Physician	0032,1032	PN		X			X		
Requesting Service	0032,1033	LO		X			X		

The possible Status Responses during a Worklist query are shown in Table 18.

Table 18: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The query results are displayed. The association is released. Report message in console.
Failed	A900	Identifier does not match SOP	No query results are displayed. The association is released. The reason is logged and reported by message in console.
	Cxxx	Unable to process	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Refused	A700	Out of resources	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The Query Worklist job continues.

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Service Status	Error Code	Further Meaning	Behavior
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The Query Worklist job continues.
Cancel	FE00	Matching terminated due to Cancel request	No query results are displayed. The association is released. The reason is logged and reported by message in console.

The possible Communication Failures during a Worklist query are shown in Table 19.

Table 19: DICOM Command Communication Failure Behavior.

Exception	Behavior
ARTIM Time-out	The Query Worklist job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The query fails. The reason is logged and reported to the user.

4.2.1.3.3. (Real-World) Activity – Modality Performed Procedure Step as SCU

4.2.1.3.3.1. Description and Sequencing of Activities

When the first scan of an examination is initiated the Network AE sets up an association to the MPPS server (typically a RIS) and sends an N-CREATE message with all appropriate information about the examination on the MR scanner; the status will be set to IN-PROGRESS.
After clicking the “Ready” or “Incomplete” button the Network AE will Archive Images that were acquired (only those that have not been archived yet) and send an N-SET message with the end date and end time and a status of respectively “COMPLETED” or “DISCONTINUED”. The MPPS function is independent of the use of storage commitment.
The sequence diagram in figure 7 shows the interaction for the MR System RWA Report MPPS.

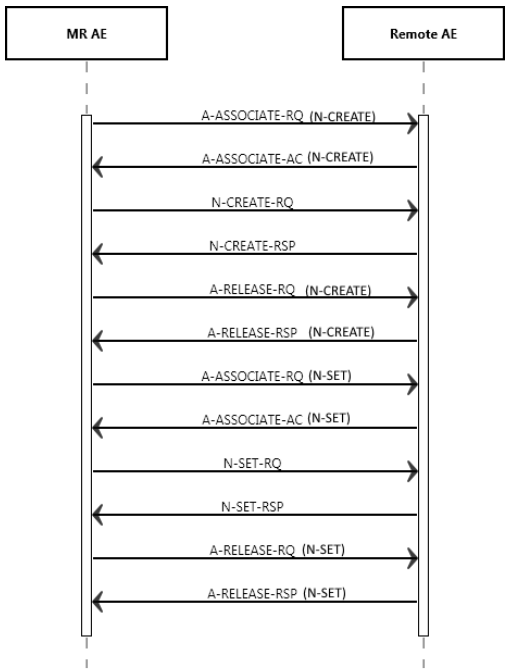

Figure 7: Sequencing of Report MPPS

4.2.1.3.3.2. Proposed Presentation Contexts

The presentation context proposed by Network AE for Report MPPS is defined in Table 20.

Table 20: Proposed Presentation Contexts for (Real-World) Activity – Modality Performed Procedure Step As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Modality Performed Procedure Step SOP Class	1.2.840.10008.3.1.2.3.3	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

Note that the order of the proposed transfer syntaxes is configurable.

4.2.1.3.3.3. SOP Specific Conformance for Modality Performed Procedure Step SOP Class

The mapping of attributes for Report MPPS is specified in chapter 8.1.2.

4.2.1.3.3.3.1. Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-CREATE-SCU

The possible responses behavior for N-CREATE-RQ is shown in Table 21.

Table 21: MPPS Request Identifiers for N-CREATE-RQ

Attribute Name	Tag	VR	Value	Comment
SOP Common Module				
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148, GB18030	Attribute required if expanded character set used
Performed Procedure Step Relationship Module				
Patient ID	0010,0020	LO		
Patient's Birth Date	0010,0030	DA		
Patient's Name	0010,0010	PN		
Patient's Sex	0010,0040	CS	F, M, O	
Referenced Patient Sequence	0008,1120	SQ		
Scheduled Step Attributes Sequence	0040,0270	SQ		
>Accession Number	0008,0050	SH		
>Requested Procedure Description	0032,1060	LO		
>Requested Procedure ID	0040,1001	SH		
>Scheduled Procedure Step Description	0040,0007	LO		
>Scheduled Procedure Step ID	0040,0009	SH		
>Study Instance UID	0020,000D	UI		
>Referenced Study Sequence	0008,1110	SQ		
>>Referenced SOP Class UID	0008,1150	UI		
>>Referenced SOP Instance UID	0008,1155	UI		
>Scheduled Protocol Code Sequence	0040,0008	SQ		
>>Code Value	0008,0100	SH		
>>Coding Scheme Designator	0008,0102	SH		
>>Coding Scheme Version	0008,0103	SH		
>>Code Meaning	0008,0104	LO		

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Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Information Module				
Performed Location	0040,0243	SH		
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Step End Date	0040,0250	DA		
Performed Procedure Step End Time	0040,0251	TM		
Performed Procedure Step ID	0040,0253	SH		
Performed Procedure Step Start Date	0040,0244	DA		
Performed Procedure Step Start Time	0040,0245	TM		
Performed Procedure Step Status	0040,0252	CS	IN PROGRESS	
Performed Procedure Type Description	0040,0255	LO		
Performed Station AE Title	0040,0241	AE		
Performed Station Name	0040,0242	SH		
Procedure Code Sequence	0008,1032	SQ		
Image Acquisition Results Module				
Modality	0008,0060	CS	MR	Applied value: MR
Study ID	0020,0010	SH		
Performed Protocol Code Sequence	0040,0260	SQ		
Performed Series Sequence	0040,0340	SQ		Always EMPTY
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Coding Scheme Version	0008,0103	SH		
>Code Meaning	0008,0104	LO		
>Protocol Context Sequence	0040,0440	SQ		
Billing And Material Management Code Module				
Film Consumption Sequence	0040,0321	SQ		Always EMPTY

The possible status responses for N-CREATE-RQ actions are shown in Table 22.

Table 22: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Conformation, Matching is complete	The SCU has successfully returned all matching information. The association will be released. Message in console.
Failed	xxxx	(any other failure)	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. Message in console. The reason is logged.
	0110	Performed procedure step object may no longer be updated	(Error ID A710) Message in console. The reason is logged.
Warning	0116	Attribute Value Out of Range	The MPPS operation is considered successful but the status meaning is logged. Additional information in the Response identifying the attributes out of range will be logged (i.e. Elements in the Modification List / Attribute List)

4.2.1.3.3.3.2. Dataset Specific Conformance for Modality Performed Procedure Step SOP Class N-SET-SCU

The possible responses behavior for N-SET-RQ is shown Table 23.

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Table 23: MPPS Request Identifiers for N-SET-RQ

Attribute Name	Tag	VR	Value	Comment
Performed Procedure Step Information Module				
Performed Procedure Step Description	0040,0254	LO		
Performed Procedure Step End Date	0040,0250	DA		
Performed Procedure Type Description	0040,0255	LO		
Performed Procedure Step End Time	0040,0251	TM		
Performed Procedure Step Status	0040,0252	CS	COMPLETED, DISCONTINUED	Not always present
Procedure Code Sequence	0008,1032	SQ		
Code Value	0008,0100	SH		
Coding Scheme Designator	0008,0102	SH		
Coding Scheme Version	0008,0103	SH		
Code Meaning	0008,0104	LO		
Image Acquisition Results Module				
Performed Protocol Code Sequence	0040,0260	SQ		
>Code Value	0008,0100	SH		
>Coding Scheme Designator	0008,0102	SH		
>Coding Scheme Version	0008,0103	SH		
>Code Meaning	0008,0104	LO		
Performed Series Sequence	0040,0340	SQ		
>Operators' Name	0008,1070	PN		
>Performing Physician's Name	0008,1050	PN		
>Protocol Name	0018,1030	LO		
>Retrieve AE Title	0008,0054	AE		
>Series Description	0008,103E	LO		
>Series Instance UID	0020,000E	UI		
>Referenced Image Sequence	0008,1140	SQ		

Possible status responses from N-SET-RQ actions are shown in Table 24.

Table 24: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Confirmation, The SCP has completed the operation successfully.	The association will be released. Message in console. The SCU has successfully returned all matching information
Failed	0110	Performed procedure step object may no longer be updated	(Error ID A710) Message in console. The reason is logged.
	xxxx	(Any other status code.)	The Association is aborted using A-ABORT and the MPPS is marked as failed. The status meaning is logged and reported to the user. Message in console. The reason is logged.
Warning	0116	Attribute Value Out of Range	The MPPS operation is considered successful but the status meaning is logged. Additional information in the Response identifying the attributes out of range will be logged (i.e. Elements in the Modification List/Attribute List)

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4.2.1.3.4. (Real-World) Activity – FIND as SCU

4.2.1.3.4.1. Description and Sequencing of Activities

The MR System RWA Find as SCU (Find Remote Images) involves the query of a remote system to find matching data in the remote database. The operator queries a remote database by means of the query tool in the MR System. After clicking the Patient Administration – “Filter” button the Filter dialog offers the possibility to enter the required matching keys. The operator clicks on the “Apply Filter” button to activate the specified filter settings or the “Proceed” button to reset the Patient Administration according to the specified filter settings.

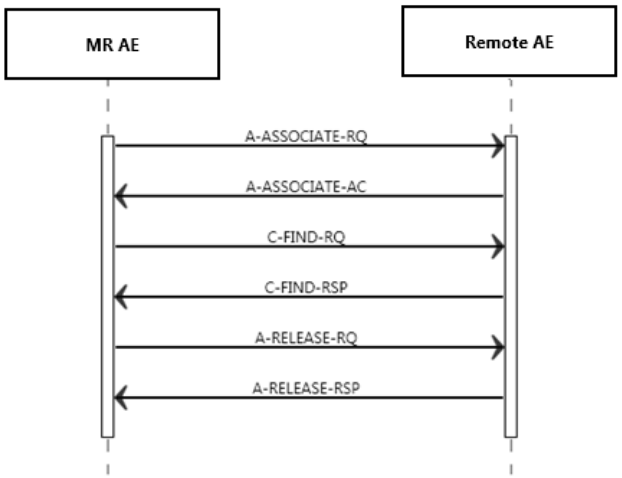

Figure 8: (Real World) Activity – Find Remote Images

The Query dialog is initiated when clicking either the Patient Administration dialog – “Connect” button or the Filter dialog – “Proceed” button. The Network AE will try and request an association with the Query/Retrieve SCP. Then a query filter can be specified and the Network AE initiates a new association to send query requests (as specified in the Filter dialog) to the Query/Retrieve SCP, starting with Patient or Study level query (for Patient Root (preferred) or Study Root model respectively) through to Series level queries (i.e. no Image level queries).
The association is released when the execution of the query completes (the Q/R dialog on the GUI is closed).

4.2.1.3.4.2. Proposed Presentation Contexts

The proposed presentation contexts for FIND as SCU are defined in Table 25.

Table 25: Proposed Presentation Contexts for (Real-World) Activity – FIND As SCU

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.

The MR System does not support extended negotiations.

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4.2.1.3.4.3. SOP Specific Conformance for Patient Root QR Information Model - FIND SOP Class

The MR System provides standard conformance to this SOP class. The MR System AE does not generate queries containing optional keys and it does not generate relational queries.

4.2.1.3.4.3.1. Dataset Specific Conformance for Patient Root QR Information Model - FIND SOP Class C-FIND-SCU

In Table 26 the supported query keys for each query level are described. Universal matching is supported by default.

Table 26: Supported Query Keys for Patient Root Information Model

Patient Root Information Model			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	PATIENT/STUDY/SERIES/IMAGE
Q/R Patient Level			
Patient ID	0010,0020	LO	
Patient's Name	0010,0010	PN	
Q/R Study Level			
Accession Number	0008,0050	SH	
Patient ID	0010,0020	LO	No filter value
Study Date	0008,0020	DA	
Study ID	0020,0010	SH	
Study Instance UID	0020,000D	UI	
Study Time	0008,0030	TM	
Q/R Series Level			
Modality	0008,0060	CS	MR
Patient ID	0010,0020	LO	Not filter value
Series Number	0020,0011	IS	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Q/R Image Level			
SOP Class UID	0008,0016	UI	
SOP Instance UID	0008,0018	UI	
Patient ID	0010,0020	LO	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Instance Number	0020,0013	IS	

Depending on the configuration, the MR System shows the following behavior.
If the remote system is configured as archive (PACS) then the MR System requires a non-universal matching query filter before performing a query on the remote system.
Otherwise the Network AE will perform an initial universal matching query. After this initial query the subsequent queries will be as specified in the Patient Administration Filter.
The MR System provides the Patient Administration – Filter dialog to enter matching criteria for the following matching keys.

Table 27: Patient administration Filter

Filter Key	DICOM Matching Key Name	DICOM Matching Key Tag	Note (UI Input)
Accession Number	Accession Number	(0008,0050)	Any value. Default value is empty.
	Scheduled Procedure Step Sequence	(0040,0100)	-
Modality	> Modality	(0008,0060)	Select * or MR. Default value is empty (*).

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Filter Key	DICOM Matching Key Name	DICOM Matching Key Tag	Note (UI Input)
Scheduled Station	> Scheduled Station AE Title	(0040,0001)	Select one of the configured AE Titles. Default value is the local AE Title.
Start Date	> Scheduled Procedure Step Start Date	(0040,0002)	Begin of range: positive number for days before today. Default value is today (0).
End Date	> Scheduled Procedure Step End Date	(0040,0003)	End of range: positive number for days after today. Default value is tomorrow (1).

The use of specific character set is as specified in section 6, Support of Character Sets. The specific character set value is not checked.
The possible Status Responses are shown in table 28.

Table 28: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The query results are displayed. The association is released. Report message in console.
Refused	A700	Out of resources – Unable to calculate number of matches	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Failed	A900	Identifier does not match SOP class	No query results are displayed. The association is released. The reason is logged and reported by message in console.
	Cxxx	Unable to process	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Cancel	FE00	Sub-operations terminated due to Cancel indication	No query results are displayed. The association is released. The reason is logged and reported by message in console.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The Query Images job continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The Query Images job continues.

Table 29: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	N/A
Reply Time-out	The query fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The query fails. The reason is logged and reported to the user.

4.2.1.3.4.4. SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

The MR System provides standard conformance to this SOP class. The MR System AE does not generate queries containing optional keys and it does not generate relational queries.

4.2.1.3.4.4.1. Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-SCU

In table 30 the supported query keys for each query level are described. Universal matching is supported as default.

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Table 30: Supported Query Keys for Study Root Information Model

Patient Root Information Model			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	STUDY/SERIES/IMAGE
Q/R Study Level			
Accession Number	0008,0050	SH	
Patient ID	0010,0020	LO	No filter value
Patient Name	0010,0010	PN	
Study Date	0008,0020	DA	
Study ID	0020,0010	SH	
Study Instance UID	0020,000D	UI	
Study Time	0008,0030	TM	
Q/R Series Level			
Modality	0008,0060	CS	MR
Series Number	0020,0011	IS	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Q/R Image Level			
SOP Class UID	0008,0016	UI	
SOP Instance UID	0008,0018	UI	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Instance Number	0020,0013	IS	

The possible Status Responses for Study Root Information Model are shown in Table 31.

Table 31: Status response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The find results are displayed.
Refused	A700	Out of Resources	No find results are displayed. The reason is logged.
Failed	A900	Identifier does not match SOP class	No find results are displayed. The reason is logged.
	Cxxx	Unable to process	No find results are displayed. The reason is logged.
Cancel	FE00	Matching terminated due to Cancel Request	No find results are displayed. The reason is logged.
Pending	FF00	Matches are continuing – Current match is supplied and any optional keys were supported in the same manner as required keys	The find command continues.
	FF01	Matches are continuing – Warning that one or more optional keys were not supported for existence and/or matching for this identifier	The find command continues.

The possible Communication Failures for Study Root Information Model are listed in Table 32.

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Table 32: DICOM Command Communication Failure Behavior for Study Root Information Model.

Exception	Behavior
ARTIM Time-out	N/A
Reply Time-out	The query fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The query fails. The reason is logged and reported to the user.

4.2.1.3.5. (Real-World) Activity – MOVE as SCU

4.2.1.3.5.1. Description and Sequencing of Activities

The RWA Move as SCU (Move Remote Images) involves the retrieval of objects from a remote system by moving matching objects from the remote database to the local database or to another remote database.

The MR System Network AE initiates for each copy request an association to the selected remote DICOM node and uses this node to send the Retrieve (C-MOVE) request (and receives the associated responses). An examination may contain Images, Presentation states, Raw data objects or Private objects. For successfully operation all systems must be configured to make a Retrieve (C-MOVE) possible. In case the move is to a third station this must also be defined on both systems (MR system and system sending the objects). It is important that the definition on the MR system is consistent with the definition at the moving station.

The association is released after the final Retrieve (C-MOVE) response for the related request has been received (no more pending).

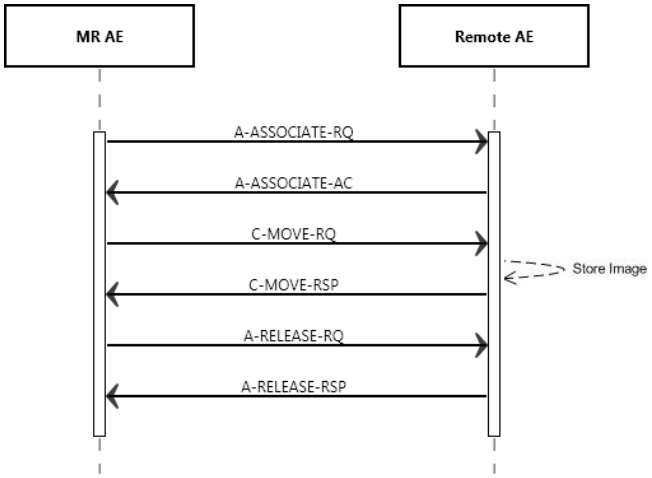

Figure 9: (Real World) Activity – Move Remote Images

4.2.1.3.5.2. Proposed Presentation Contexts

The presentation contexts for MOVE as SCU are defined in table 33.

Table 33: Proposed Presentation Contexts for (Real-World) Activity – MOVE As SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

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Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.
The MR System AE does not support extended negotiations.

4.2.1.3.5.3. SOP Specific Conformance for Patient Root QR Information Model - MOVE SOP Class

The MR System provides standard conformance for the Patient Root QR Information Model - MOVE SOP Class.

4.2.1.3.5.3.1. Dataset Specific Conformance for Patient Root QR Information Model - MOVE SOP Class C-MOVE-SCU

The behavior of the Identifiers for MOVE is summarized in this section. The move destination will be MR system here.

Table 34: Identifiers for MOVE Patient Root Information Model as SCU

Patient Root Information Model			
Attribute Name	Tag	VR	Comment
Query/Retrieve Level	0008,0052	CS	Applied value: SERIES
Q/R Series level			
Patient ID	0010,0020	LO	
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	

The DICOM C-MOVE Patient Root Information Model Command Status Response Handling is shown in the Table 35.

Table 35: Status Response for C-MOVE Patient Root Information Model

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete-No Failures	The move job is marked as completed. The association is released.
Refused	A701	Out of Resources- Unable to calculate number of matches	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A702	Out of Resources – Unable to perform sub-operations	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A801	Move destination unknown	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Failed	A900	Identifier does not match SOP class	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	Cxxx	Unable to process	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Cancel	FE00	Sub-operations terminated due to Cancel Indication	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Warning	B000	Sub-operations complete – One or more failures	The move job is marked as completed. The association is released.
Pending	FF00	Sub-operations are continuing.	The move job continues.

The possible Communication Failures during a C-MOVE as SCU are shown in the Table 36.

Table 36: DICOM Command Communication Failure Behavior for C-MOVE Patient Root Information Model.

Exception	Behavior
ARTIM Time-out	The move job fails in case of association setup. The reason is logged and reported to the user.

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Exception	Behavior
Network Reply Time-out	The move job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	N/A
Association aborted	The move job fails. The reason is logged and reported to the user.

4.2.1.3.5.4. SOP Specific Conformance for Study Root QR Information Model - MOVE SOP Class

The MR System provides standard conformance to this SOP class.

4.2.1.3.5.4.1. Dataset Specific Conformance for Study Root QR Information Model - MOVE SOP Class C-MOVE-SCU

The identifiers for C-MOVE as SCU are listed in the Table 37.

Table 37: Identifiers for MOVE Study Root Information Model as SCU

Study Root Information Model			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	Applied value: SERIES
Q/R Series level			
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	

The DICOM Status Response for C-MOVE-SCU is shown in Table 38.

Table 38: Status response for Study Root Information Model C-MOVE-SCU.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete-No Failures	The move job is marked as completed. The association is released.
Refused	A701	Out of Resources- Unable to calculate number of matches	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A702	Out of Resources – Unable to perform sub-operations	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	A801	Move Destination unknown	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Failed	A900	Identifier does not match SOP class	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
	Cxxx	Unable to process	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Cancel	FE00	Sub-operations terminated due to Cancel Indication	The move job is marked as failed. The association is released. The reason is logged and reported to the user.
Warning	B000	Sub-operations complete – One or more Failures	The move job is marked as completed. The association is released.
Pending	FF00	Sub-operations are continuing.	The move job continues.

The possible Communication Failures for C-MOVE-SCU are shown in the table 39.

Table 39: DICOM Command Communication Failure Behavior for Study Root Information Model C-MOVE-SCU

Exception	Behavior
ARTIM Time-out	The move job fails in case of association setup. The reason is logged and reported to the user.
Reply Time-out	The move job fails and the association is aborted. The reason is logged and reported to the user.
Association Time-out SCU	N/A
Association aborted	The move job fails. The reason is logged and reported to the user.

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4.2.1.3.6. (Real-World) Activity – Image Export

4.2.1.3.6.1. Description and Sequencing of Activities

As defined by the MR System RWA Archive Images, using the local patient database one may export Images to the selected network destination by clicking the PACS button “Copy Selection To PACS”. For each selected Examination the Network AE will successively do the following actions.

Note:- For any other DICOM node configured as Others. Use Network button.

The Network AE initiates an association with the configured PACS node. Over this association all images, presentation states and other related data are exported. When the storage job has finished, be it successfully or not, the Network AE releases the association.
If the storage job failed then the storage job has to be executed over again.
If storage commitment is configured for each exported Series the Network AE requests storage commitment from the PACS. Each storage commitment request handles the storage commitment of one series of images over a separate association.

The Figure below shows the sequence diagram for the storage of an Examination containing one Series of images.

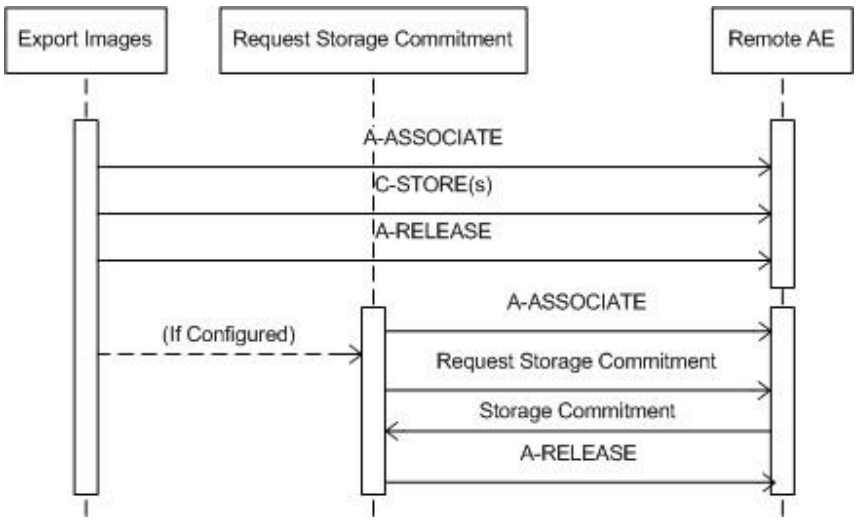

Figure 10: (Real Word) Activity - Export Images

4.2.1.3.6.2. Proposed Presentation Contexts

The presentation contexts proposed by Network AE for Image Export are defined in Table 40.

Table 40: Proposed Presentation Contexts for (Real-World) Activity – Image Export

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.
The MR System AE does not support extended negotiations.

4.2.1.3.6.3. SOP Specific Conformance for Storage SOP Classes

As Grayscale Softcopy Presentation State objects are stored as separate series together with the images they belong to. The Network AE initiates committing those Series in the same association if negotiated for, one after the other.

4.2.1.3.6.3.1. Dataset Specific Conformance for C-STORE-RQ

The possible Status Responses for the export Images storage are shown in table 41.

Table 41: Status Response for C-STORE-RQ.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Storage is complete. Successful stored	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.
Refused	A7xx	Out of Resources	The Export Images job fails and the association is released. The reason is logged and reported by message in console.
Error	A9xx	Data Set does not match SOP Class	The Export Images job fails and the association is released. The reason is logged and reported by message in console.
	Cxxx	Cannot understand	The store job fails and the association is released. The reason is logged and reported to the user.

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Service Status	Error Code	Further Meaning	Behavior
Warning	B000	Coercion of Data Elements	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.
	B006	Elements Discard	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.
	B007	Data Set does not match SOP Class	Message in console. The Export Images job continues. When the last image of the job has been stored the job is marked as Completed at the queue manager and the association is released.

When receiving a C-STORE response with 'Refused' or 'Error' status the Network AE releases the association. All the images associated with the job will be considered by the Network AE to have failed to transfer. The Network AE has the ability to automatically recover from this situation and will attempt to send all the images at a later time.

The possible communication failures during a C-STORE-RQ are listed in Table 42.

Table 42: DICOM Command Communication Failure Behavior for C-STORE-RQ.

Exception	Behavior
ARTIM Time-out	The store job fails in case of association setup. The reason is logged and reported to the user.
Reply Time-out	The store job fails in case of association setup. The reason is logged and reported to the user.
Association Time-out SCU	The association is released.
Association Aborted	The store job fails. The reason is logged and reported to the user.

4.2.1.3.7. (Real-World) Activity – Storage Commitment Push Model as SCU

4.2.1.3.7.1. Description and Sequencing of Activities

The Network AE supports both synchronous and asynchronous storage commitment. When synchronous storage commitment is configured and the event report is not received within the configured time-out interval, the Network AE releases the association and the storage commitment continues asynchronously.
The Figure below shows the sequence diagram for the storage and asynchronous storage commitment of an Examination containing one Series of images.

If configured, Storage Commitment will be initiated in a new association after closing the storage of the related image storage (C-STORE). This new association will be open until the remote archive sends a storage commitment report (Synchronous) or when the configured maximum time is passed. When this maximum configured period is passed, it is the responsibility of the remote archive to setup a new association with MR System and send the storage commitment report (asynchronous behavior).

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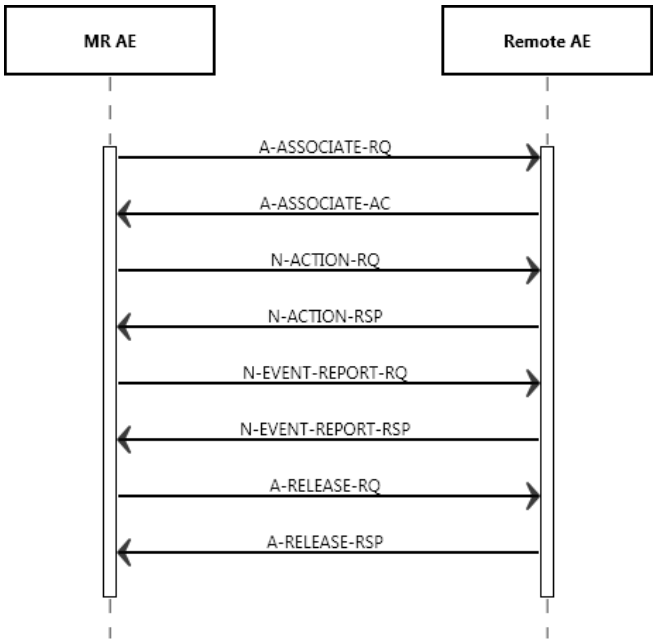

Figure 11: Sequencing of Storage Export with Synchronous Storage Commitment

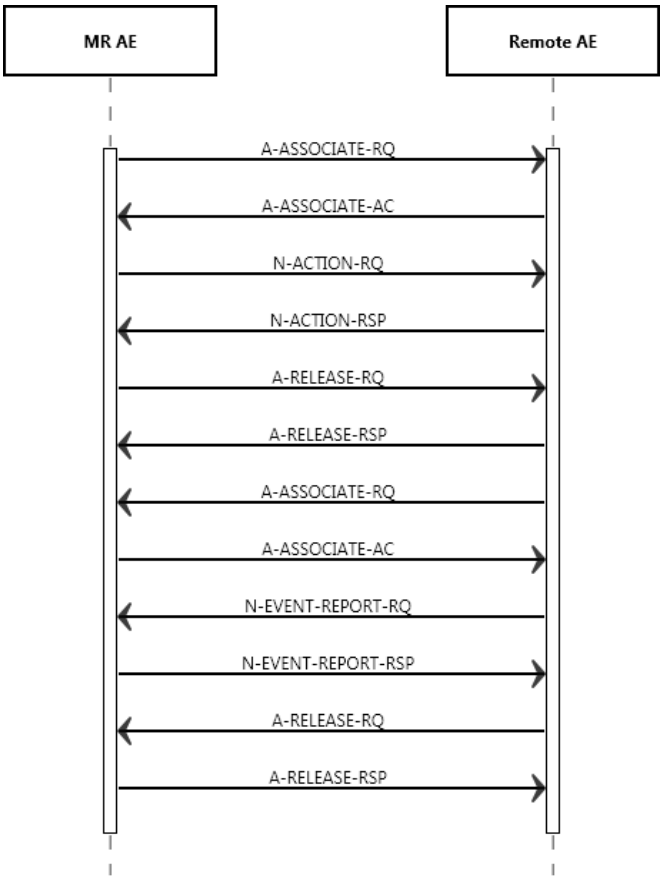

Figure 12: Sequencing of Storage Export with Asynchronious Storage Commitment

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4.2.1.3.7.2. Proposed Presentation Contexts

The proposed presentation contexts for Storage Commitment Push Model as SCU are defined in Table 43.

Table 43: Proposed Presentation Contexts for (Real-World) Activity – Storage Commitment Push Model as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.
The MR System AE does not support extended negotiations.

4.2.1.3.7.3. SOP Specific Conformance for Storage Commitment Push Model SOP Class

MR System conforms to the standard Storage Commitment model.

As Grayscale Softcopy Presentation State objects are stored as separate series together with the images they belong to, the Network AE will initiate separate associations for committing those Series – one after the other.

The storage commitment status is shown in the Patient Administration Examination status. If the storage commitment failed, the operator is responsible for exporting the images again.
Details regarding the response behavior for the Archive Images storage commitment request are described in the next sections.

4.2.1.3.7.3.1. Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-EVENT-REPORT-SCP

Details regarding the Dataset Specific response behavior for Storage Commitment Attributes for N-EVENT-REPORT-RSP are described in this section.

On receiving a storage commitment result with Event Type ID 1 (Storage Commitment Request Successful) the archive status of the examination is updated in the Administration window of the MR scanner, to show.
On receiving a storage commitment result with Event Type ID 2 (Storage Commitment Request Complete – Failures Exist) the Network AE behaves as summarized in Table 44.

Table 44: Status Response for N-EVENT-REPORT.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Operation complete	Continues with waiting for storage commitment.
Failure	xxxx	(any failure)	The reason is logged.
	0110	Processing failure	Retry storage commitment request.
	0112	No such object instance	Retry store and storage commitment request.
	0119	Class / Instance conflict	Inform user and abort.
	0122	Referenced SOP class not supported	Inform user and abort.
	0131	Duplicate transaction	UID Inform user and abort.
	0213	Resource limitation	Retry storage commitment request.

The communication status behavior of the N-EVENT-REPORT is listed in Table 45.

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Table 45: DICOM Command Communication Failure Behavior for N-EVENT-REPORT.

Exception	Behavior
ARTIM Time-out	The reason is logged.
Network Reply Time-out	The association is released. Continues with waiting for storage commitment.
Association Time-out SCU	The association is released. Continues with waiting for storage commitment.
Association aborted	Continues with waiting for storage commitment.

4.2.1.3.7.3.2. Dataset Specific Conformance for Storage Commitment Push Model SOP Class N-ACTION-SCU

This chapter describes the Dataset Specific response behavior for Storage Commitment Attribute N-ACTION-RQ.

Table 46: Storage Commitment Attribute for N-ACTION-RQ

Attribute Name	Tag	Comment
Storage Commitment Module		
Transaction UID	0008,1195	
Referenced SOP Sequence	0008,1199	
>Referenced SOP Class UID	0008,1150	
>Referenced SOP Instance UID	0008,1155	

The possible status responses for N-ACTION-RQ are shown in the Table 47.

Table 47: Status Response for A-ACTION-RQ.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Conformation. Operation complete	The association will be released. Message in console.
Failure	xxxx	(any failure)	Message in console. The reason is logged.

The possible communication failures are shown in the below 48.

Table 48: DICOM Command Communication Failure Behavior N-ACTION.

Exception	Behavior
ARTIM Time-out	The reason is logged.
Reply Time-out	The association is released. The Archive Images job expects storage commitment report.
Association Time-out SCU	The association is released. The Archive Images job expects storage commitment report.
Association Aborted	The Archive Images job expects storage commitment report.

4.2.1.4. Association Acceptance Policy

This section describes the conditions under which the MR system will accept an association from a remote system.
The possible AE Association rejections are handled as shown in Table 49.

Table 49: Association Reject Reasons Handling

Result	Source	Reason/Diagnosis	Behavior
1 - rejected permanent	1 - DICOM UL service-user	1 – no reason given	Log entry.
		2 – application context name not supported	Log entry.
		3 – calling AE title not recognized	Log entry.
	2 - DICOM UL service provider (ACSE related function)	1 – no reason given	Log entry.
		2 – protocol version not supported	Log entry.
	3 - DICOM UL service provider	1 – temporary congestion	Log entry.

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Result	Source	Reason/Diagnosis	Behavior
	(Presentation related function)	2 – local limit exceeded	Log entry.
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	Log entry.
		2 – application context name not supported	Log entry.
		3 – calling AE title not recognized	Log entry.
	2 - DICOM UL service provider (ACSE related function)	1 – no reason given	Log entry.
		2 – protocol version not supported	Log entry.
	3 - DICOM UL service provider (Presentation related function)	1 – temporary congestion	Log entry.
		2 – local limit exceeded	Log entry.

The possible Association aborts are handled as shown in Table 50.

Table 50: Association Abort Policies Handling.

Source	Reason/Diagnosis	Behavior
0 - DICOM UL service-user (initiated abort)	0 - reason-not-specified	When received, the Network AE terminates the connection and logs the event. This is sent when: - Association times out due to inactivity - Any other problem than the ones specified for the MR System as SCP in the rows below.
2 - DICOM UL service-provider (initiated abort)	0 - reason-not-specified	When received, the Network AE terminates the connection and logs the event. This is sent when Import fails.
	1 - unrecognized-PDU	When received, the Network AE terminates the connection and logs the event. This is sent when an unrecognized PDU type is received.
	2 - unexpected-PDU	When received, the Network AE terminates the connection and logs the event. This is sent when the received PDU type is not expected in the current state of connection.
	4 - unrecognized-PDU parameter	When received, the Network AE terminates the connection and logs the event. This is sent when an unrecognized Associate PDU item is received.
	5 - unexpected-PDU parameter	When received, the Network AE terminates the connection and logs the event. This is sent when: - One of the Associate PDU items is received more than once. - One of the Associate PDU items is received unexpectedly.
	6 - invalid-PDU-parameter value	When received, the Network AE terminates the connection and logs the event. This is sent when: - One of the Associate PDU items is received more than once. - One of the Associate PDU items is not received. - Empty Called AE Title String (space-only) is received. - Empty Calling AE Title String (space-only) is received. - Unknown abstract syntax is received - The length or the format of the received PDU item is invalid.

4.2.1.4.1. (Real-World) Activity – Verification as SCP

4.2.1.4.1.1. Description and Sequencing of Activities

As defined by the MR System RWA Verify, the Network AE will act as a Verification SCP for any remote SCU.

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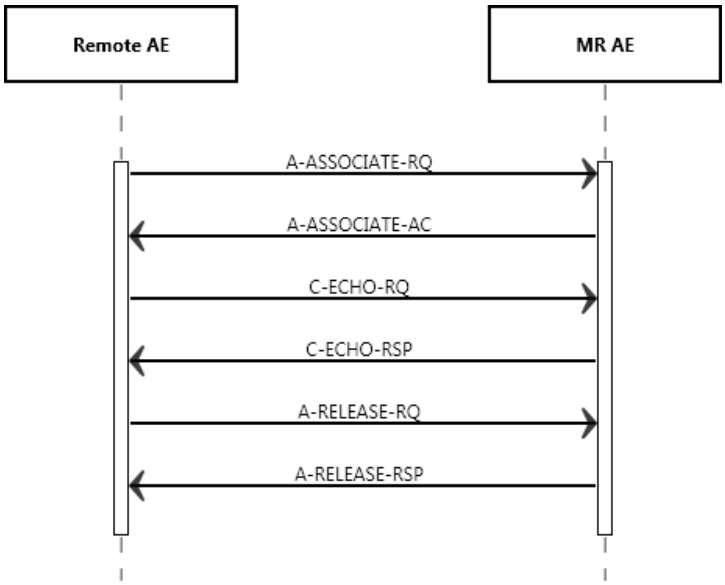

Figure 13: (Real World) Activity – Request Verification

The Network AE accepts associations to verify application level communication using the C-ECHO command.

4.2.1.4.1.2. Accepted Presentation Contexts

The acceptable presentation contexts for Verification as SCP are defined in Table 51.

Table 51: Acceptable Presentation Contexts for (Real-World) Activity – Verification as SCP

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Verification SOP Class	1.2.840.10008.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE and shall be chosen in case multiple Transfer Syntaxes are proposed in the Association Negotiation.

The MR System does not support extended negotiations.

4.2.1.4.1.3. SOP Specific Conformance for Verification SOP Class

The MR System provides standard conformance to Verification SOP class as an SCP.

4.2.1.4.1.3.1. Dataset Specific Conformance for Verification C-ECHO RSP

This section describes the dataset specific response behavior for Verification C-ECHO-RSP.
This part of the section includes the dataset specific behavior, i.e. error codes, error and exception handling, time-outs, etc.

Table 52: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	e.g. Matching is complete	Eg. The SCP has successfully returned all matching information

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Table 53: DICOM Command Communication Failure Behavior for C-ECHO RSP

Exception	Behavior
ARTIM Time-out	The verification request fails. The reason is logged.
Reply Time-out	The verification request fails and association is aborted. The reason is logged.
Association Time-out SCU	The association is released.
Association aborted	The verification request fails. The reason is logged.

4.2.1.4.2. (Real-World) Activity – FIND as SCP

4.2.1.4.2.1. Description and Sequencing of Activities

The query dialog is initiated by the Remote AE. The Remote AE request an association with the MR AE to send query requests to the MR AE, starting with Patient or Study level query (for Patient Root (preferred) or Study Root model respectively through to Series level queries (i.e. no Image level queries).

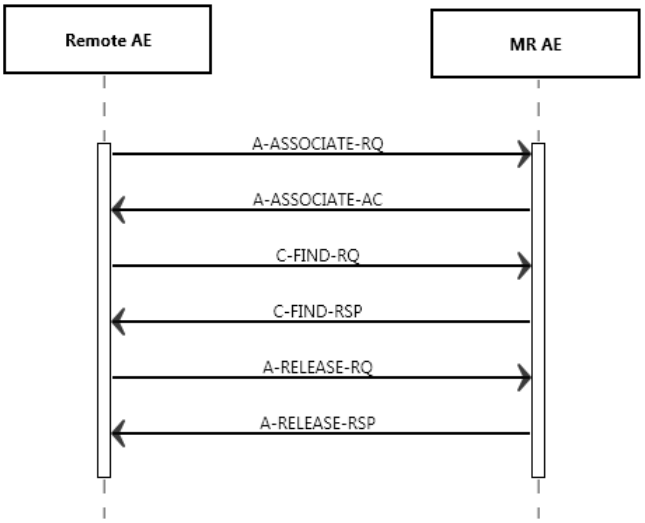

Figure 14: Sequencing of Query Images

4.2.1.4.2.2. Accepted Presentation Contexts

The acceptable presentation contexts for FIND as SCP are defined in Table 54.

Table 54: Acceptable Presentation Contexts for (Real-World) Activity – FIND as SCP

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Patient Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.1.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
Study Root QR Information Model - FIND SOP Class	1.2.840.10008.5.1.4.1.2.2.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

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The MR AE accepts all contexts that are common in the proposed and acceptable Presentation Contexts. This means that the MR AE can accept multiple proposed presentation contexts with the same SOP class but different transfer syntaxes.

There is no check for duplicate contexts, and these will therefore be accepted.

The MR AE does not support extended negotiations.

4.2.1.4.2.3. SOP Specific Conformance for Patient Root QR Information Model - FIND SOP Class

The MR AE provides standard conformance to the Query/Retrieve service class. Relational queries are not supported. The MR AE can handle a maximum of 6 incoming association requests at the same time.

When queried with optional keys, the MR AE responds successfully for available keys if queried for universal matching; otherwise the MR AE responds with a warning.

When queried with optional keys with non-universal matching, the MR AE returns information using universal matching for those keys.

4.2.1.4.2.3.1. Dataset Specific Conformance for Patient Root QR Information Model - FIND SOP Class C-FIND-RSP

Available query keys for C-FIND-RSP are listed in Table 55.

Table 55: Requested Query Keys for Patient Root Information Model

Patient Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS		
Specific Character Set	0008,0005	CS		
Q/R Patient level				
Ethnic Group	0010,2160	SH	Single value, Universal, WildCard	
Patient ID	0010,0020	LO	Single value, Universal, WildCard	
Patient's Birth Date	0010,0030	DA	Single value, Universal, Range	
Patient's Name	0010,0010	PN	Single value, Universal, WildCard	
Patient's Sex	0010,0040	CS	Single value, Universal, WildCard	
Other Patient IDs	0010,1000	LO	Single value, Universal, WildCard	
Issuer of Patient ID	0010,0021	LO	Single value, Universal, WildCard	
Patient Comments	0010,4000	LT	Universal	
Number of patient related studies	0020,1200	IS	Universal	
Number of patient related series	0020,1202	IS	Universal	
Number of patient related instances	0020,1204	IS	Universal	
Q/R Study level				
Accession Number	0008,0050	SH	Single value, Universal, WildCard	
Study Date	0008,0020	DA	Single value, Universal, Range	
Study Description	0008,1030	LO	Single value, Universal, WildCard	
Study ID	0020,0010	SH	Single value, Universal,	

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			WildCard	
Study Instance UID	0020,000D	UI	Single value, Universal, List of UID	
Study Time	0008,0030	TM	Single value, Universal, Range	
Referring Physician's Name	0008,0090	PN	Universal	
Admitting Diagnoses Description	0008,1080	LO	Single value, Universal, WildCard	
Occupation	0010,2180		Single value, Universal, WildCard	
Additional Patient History	0010,21B0		Universal	
Number of Study Related Series	0020,1206		Universal	
Number of Study Related Instances	0020,1208		Universal	
Q/R Series level				
Modality	0008,0060	CS	Single value	MR
Patient ID	0010,0020	LO		
Performed Procedure Step Description	0040,0254	LO		
Series Instance UID	0020,000E	UI	Single value, Universal, List of UID	
Study Instance UID	0020,000D	UI		

Table 56 shows the possible Status Responses for the C-FIND-RSP.

Table 56: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The C-FIND request handling is completed, no more C-FIND responses are sent.
Failed	A900	Identifier does not match SOP class	
	C000	Unable to process	The C-FIND request cannot be parsed. MR logs the reason.
Refused	A700	Out of Resources	
Pending	FF00	Matches are continuing	Current match is supplied and any optional keys were supported in the same manner as required keys. The C-FIND responses are continuing.
	FF01	Matches are continuing	Warning that one or more optional keys were not supported for existence and/or matching for this identifier. The C-FIND responses are continuing.
Cancel	FE00	Matching terminated due to Cancel Request	The C-FIND request is canceled, no more C-FIND responses are sent.

4.2.1.4.2.4. SOP Specific Conformance for Study Root QR Information Model - FIND SOP Class

The MR AE provides standard conformance to the Query/Retrieve service class. Relational queries are not supported. The MR AE can handle simultaneous C-FIND requests.

When queried with optional keys, the MR AE will respond successfully for available keys if queried for universal matching; otherwise MR AE will responds with warning.

When queried with optional keys with non-universal matching, the MR AE returns information using universal matching for those keys.

4.2.1.4.2.4.1. Dataset Specific Conformance for Study Root QR Information Model - FIND SOP Class C-FIND-RSP

Available Query keys for C-FIND-RSP are listed in Table 57

Table 57: Requested Query Keys for Study Root Information Model

Study Root Information Model				
Attribute Name	**Tag**	**VR**	**Type Of Matching**	**Comment**
Query/Retrieve Level	0008,0052	CS		
Specific Character Set	0008,0005	CS		
Q/R Study level				
Accession Number	0008,0050	SH	Single value, Universal, WildCard	
Ethnic Group	0010,2160	SH	Single value, Universal, WildCard	
Patient ID	0010,0020	LO	Single value, Universal, WildCard	
Patient's Birth Date	0010,0030	DA	Single value, Universal, Range	
Patient's Name	0010,0010	PN	Single value, Universal, WildCard	
Patient's Sex	0010,0040	CS	Single value, Universal, WildCard	
Study Date	0008,0020	DA	Single value, Universal, Range	
Study ID	0020,0010	SH	Single value, Universal, WildCard	
Study Instance UID	0020,000D	UI	Single value, Universal, List of UID	
Study Time	0008,0030	TM	Single value, Universal, Range	
Q/R Series level				
Body Part Examined	0018,0015	CS	Universal	
Modality	0008,0060	CS	Universal	MR
Series Date	0008,0021	DA	Single value, Universal, Range	
Series Instance UID	0020,000E	UI	Single value, Universal, List of UID	
Series Time	0008,0031	TM	Single value, Universal, Range	

Table 58 shows the possible status response for the C-FIND-RSP.

Table 58: Status Response for C-FIND-RSP

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete	The C-FIND request handling is completed, no more C-FIND responses are sent.
Failed	A900	Identifier does not match SOP class	N.A.
	C000	Unable to process	The C-FIND request cannot be parsed. MR logs the reason.
Refused	A700	Out of Resources	N.A.
Pending	FF00	Matches are continuing	Current match is supplied and any optional keys were supported in the same manner as required keys The C-FIND responses are continuing.
	FF01	Matches are continuing	Warning that one or more optional keys were not supported for existence and/or matching for this identifier The C-FIND responses are continuing.
Cancel	FE00	Matching terminated due to Cancel Request	The C-FIND request is canceled, no more C-FIND responses are sent.

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The possible Communication Failures are shown in the below Table 59.

Table 59: DICOM Command Communication Failure Behavior

Exception	Behavior
ARTIM Time-out	The query fails in case of association setup. The reason is logged.
Reply Time-out	The query fails and association is aborted. The reason is logged.
Association Time-out SCU	The association is released.
Association Aborted The query fails.	The query fails. The reason is logged.

4.2.1.4.3. (Real-World) Activity – MOVE as SCP

4.2.1.4.3.1. Description and Sequencing of Activities

The MR system shall accept associations from systems that wish to retrieve images from the MR database using the C-MOVE command. After MR Retrieve Local Images the MR Export Images is started.
Figure 15 shows the sequencing of retrieved images.

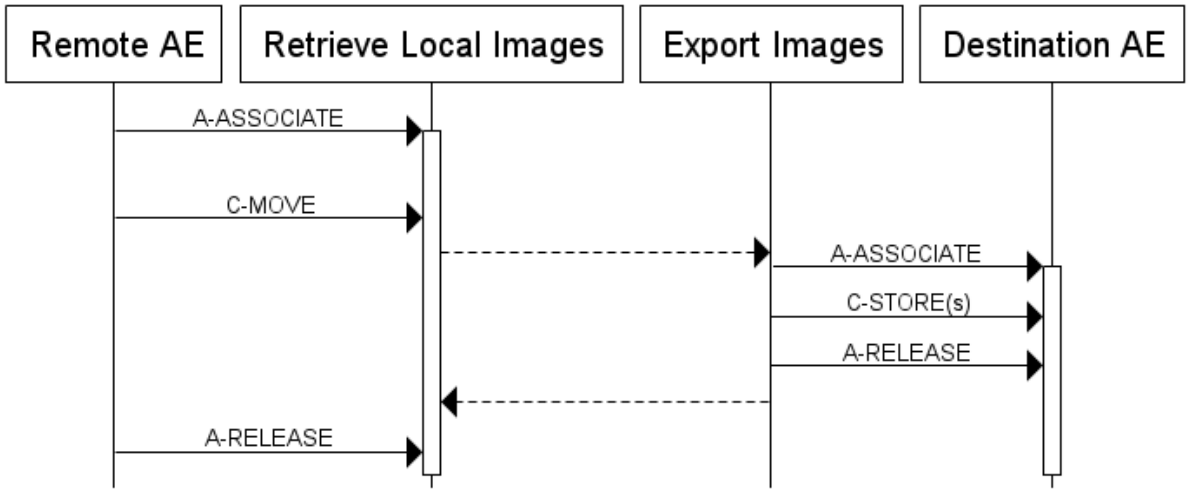

Figure 15: Sequencing of Retrieve Local Objects

4.2.1.4.3.2. Accepted Presentation Contexts

The acceptable presentation contexts for MOVE as SCP are shown in Table 60.

Table 60: Acceptable Presentation Contexts for (Real-World) Activity – MOVE As SCP

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Patient Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.1.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Implicit VR Little Endian	1.2.840.10008.1.2		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
Study Root QR Information Model - MOVE SOP Class	1.2.840.10008.5.1.4.1.2.2.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		

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Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
		Implicit VR Little Endian	1.2.840.10008.1.2		

The MR AE accepts all contexts that are common in the proposed and acceptable Presentation Contexts. This means that the MR AE can accept multiple proposed Presentation Contexts with the same SOP class but different Transfer Syntaxes.
The order of the proposed transfer syntaxes is configurable.
There is no check for duplicate contexts, and these will therefore be accepted.
The MR AE does not support extended negotiations for Patient Root QR Information Model MOVE SOP class and for Study Root QR Information Model - MOVE SOP Class.

4.2.1.4.3.3. SOP Specific Conformance for Patient Root QR Information Model - MOVE SOP Class

The MR AE provides standard conformance to MOVE SOP class as an SCP.
The possible Status Response for C-MOVE RSP is shown in Table 61.

Table 61: Status Response for C-MOVE-RSP

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No Failures	The C-MOVE command has been completed.
Refused	A701	Out of Resources – Unable to calculate number of matches	N/A
	A702	Out of Resources – Unable to perform Sub-operations	N/A
Failed	A801	Move Destination unknown	No C-STORE command will be sent. MR logs the reason.
	A900	Identifier does not match SOP class	N/A
Cancel	C000	Unable to process	The C-MOVE request cannot be parsed. No Store Command will be sent. MR logs the reason.
Warning	FE00	Sub-operations terminated due to Cancel Indication	The C-MOVE request is canceled, no more C-MOVE responses are sent.
Pending	B000	Sub-operations complete – One or more Failures	N/A

The Table 62 shows the possible Communication Failures for C-MOVE.

Table 62: DICOM Command Communication Failure Behavior for C-MOVE.

Exception	Behavior
ARTIM Time-out	The move job fails in case of association setup. The reason is logged.
Reply Time-out	The move job fails and association is aborted. The reason is logged.
Association Time-out SCU	The association is released.
Association aborted	The move job fails. The reason is logged.

4.2.1.4.3.4. SOP Specific Conformance for Study Root QR Information Model - MOVE SOP Class

The MR AE provides standard conformance to the MOVE SOP class as an SCP.

4.2.1.4.3.4.1. Dataset Specific Conformance for Study Root QR Information Model - MOVE SOP Class C-MOVE-RSP

The table 63 shows the MOVE Identifiers for Study Root Information model.

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Table 63: Identifiers for MOVE Study Root Information Model as SCP

Study Root Information Model			
Attribute Name	**Tag**	**VR**	**Comment**
Query/Retrieve Level	0008,0052	CS	Applied value: SERIES
Q/R Series level			
Series Instance UID	0020,000E	UI	
Study Instance UID	0020,000D	UI	
Patient ID	0010,0020	LO	

The possible status Responses for the C-MOVE-RSP are shown in Table 64.

Table 64: Status Response for C-MOVE

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Sub-operations complete – No Failures	The C-MOVE command has been completed.
Refused	A701	Out of Resources – Unable to calculate number of matches	N/A
	A7012	Out of Resources – Unable to perform Sub-operations	N/A
Failed	A801	Move Destination unknown	No C-STORE command will be sent. MR logs the reason.
	A900	Identifier does not match SOP class	N/A
Cancel	C000	Unable to process	The C-MOVE request cannot be parsed. No Store Command will be sent. MR logs the reason.
Warning	FE00	Sub-operations terminated due to Cancel Indication	The C-MOVE request is canceled, no more C-MOVE responses are sent.
Pending	B000	Sub-operations complete – One or more Failures	N/A

The possible communication failures for C-MOVE are shown in Table 65.

Table 65: DICOM Command Communication Failure Behavior for C-MOVE.

Exception	Behavior
ARTIM Time-out	The move job fails in case of association setup. The reason is logged.
Reply Time-out	The move job fails and association is aborted. The reason is logged.
Association Time-out SCU	The association is released.
Association aborted	The move job fails. The reason is logged.

4.2.1.4.4. (Real-World) Activity – Image Import

4.2.1.4.4.1. Description and Sequencing of Activities

As defined by the MR System RWA Import Images, the Network AE acts as a Storage SCP for any remote Storage SCU that is configured on the MR System, using an accepted presentation context.

The MR AE accepts associations from other systems that wish to store images in the MR System database, using the C-STORE command.

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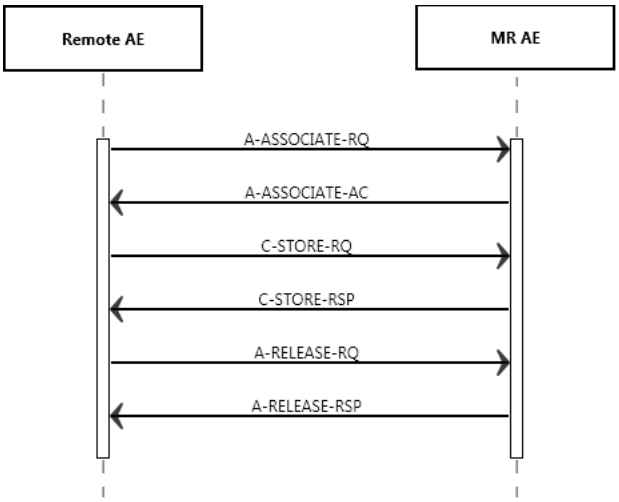

Figure 16: (Real World) Activity - Import Images

After the MR Network AE accepts an association from the remote Storage SCU the MR system will receive images from that remote Storage SCU, send store responses including the relevant status back, and releases the association on SCU request.
The MR supports a maximum number of incoming associations (default 4) for the set of SCP's. This number is configurable.

4.2.1.4.4.2. Accepted Presentation Contexts

The possible presentation contexts are shown in the table 66.

Table 66: Acceptable Presentation Contexts for (Real-World) Activity – Image Import

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4	Explicit VR Big Endian	1.2.840.10008.1.2.2	SCP	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Implicit VR Little Endian	1.2.840.10008.1.2		
		JPEG Lossless, Non-Hierarchical, FOP (Process 14)	1.2.840.10008.1.2.4.70		
		JPEG 2000 Image Compression (Lossless Only)	1.2.840.10008.1.2.4.90		

The MR System AE does not support extended negotiations for Image Import.
The order of the proposed transfer syntaxes is configurable. The preferred transfer syntax is ELE.

4.2.1.4.4.3. SOP Specific Conformance for Storage SOP Classes

The Network AE provides Level 2 (Full) conformance to the storage SOP classes.
Level 2 attributes indicates that all Type 1, Type 2, and Type 3
Attributes defined in the IOD etc. associated with the SOP Class, as well as any Standard Extended attributes (including private attributes) included in the SOP Instance, will be stored and may be accessed.

Secondary Capture images can be imported at any time and from any source.
However, the MR Network AE can only import MR images and belonging Presentation State objects that were created on a Philips MR System. These imported images may be used for reference only; successful further export is not guaranteed.

When the MR Network AE receives images that do not originate from a Philips MR System or no longer contain Philips MR Private tags, the MR Network AE does not import these images, but instead responds with error status (C000) “Cannot understand” and aborts the association.

4.2.1.4.4.3.1. Dataset Specific Conformance for C-STORE-RSP

The possible Status Responses for C-STORE are shown in Table 67.

Table 67: Status Response for C-STORE-RSP

Service Status	Error Code	Further Meaning	Behavior
Refuse	A700	Out of resources	The local database is full; recovery from this condition is left to the SCU. The MR System sends the failure response, logs the condition, and aborts the association.
Success	0000	Successful stored	The image(s) shall be stored in the local database.
Error	A900	Data Set does not match SOP Class	The SOP class of the image(s) does not match the negotiated abstract syntax. The MR System sends the failure response, logs the condition, and aborts the association.
	C000	Cannot understand	The image(s) cannot be parsed. The MR System sends the failure response, logs the condition, and aborts the association.
Warning	B000	Coercion of Data Elements	
	B007	Data Set does not match SOP Class	

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Service Status	Error Code	Further Meaning	Behavior
	B006	Elements Discarded	

Table 68 shows the possible communication failures for C-STORE-RSP.

Table 68: DICOM Command Communication Failure Behavior for C-STORE-RSP

Exception	Behavior
ARTIM Time-out	The store job fails in case of association setup. The reason is logged.
Reply Time-out	The store job fails and association is aborted. The reason is logged.
Association Time-out SCU	The association is released.
Association aborted	The store job fails. The reason is logged.

4.2.2. MR System Print

This chapter describes the Print AE in detail.

4.2.2.1. SOP Classes

This Application Entity provides Standard Conformance to the SOP Classes shown in Table 69.

Table 69: SOP Classes for MR System Print

SOP Class Name	SOP Class UID	SCU	SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	Yes	No
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Yes	No
>Printer SOP Class	1.2.840.10008.5.1.1.16	Yes	No
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Yes	No
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Yes	No

Any SOP specific behavior is documented further down in the applicable SOP specific conformance section.

4.2.2.2. Association Policies

This chapter describes the establishment of an association and the acceptance policies of the Print AE.

4.2.2.2.1. General

The following DICOM standard application context is specified.

Table 70: DICOM Application Context

Description	Value
Application Context Name	1.2.840.10008.3.1.1.1

4.2.2.2.2. Number of Associations

The number of simultaneous associations that the Print AE supports is specified in Table 71. The Print AE does not accept any incoming associations.

Table 71: Number of associations as an Association Initiator for this AE

Description	Value
Maximum number of simultaneous associations	1

4.2.2.2.3. Asynchronous Nature

Not applicable.

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4.2.2.2.4. Implementation Identifying Information

The following values are used for Implementation Class UID and Implementation Version Name.

Table 72: DICOM Implementation Class and Version for MR System Print

Implementation Class UID	1.3.46.670589.11.0.0.51.4.54.0
Implementation Version Name	Philips MR 54.0

4.2.2.2.5. Communication Failure Handling

The possible network communication failures are summarized in Table. 73

Table 73: Communication Failure Behavior

Exception	Behavior
ARTIM Timeout	The Association setup fails, and using A-ABORT and the command is marked as failed. The reason is logged and reported to the user.
Association Aborted.	The Print Image job is marked as Failed. The reason is logged and reported to the user.
Association Time-Out SCU	The Association is Released.
Network reply Time-Out	The Association is Released.

4.2.2.3. Association Initiation Policy

This section describes the conditions under which the Print AE initiates an Association.

The possible Status Responses are summarized in the table 74.

Table 74: Response Status Handler Behavior

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Matching is complete, successful operation.	The SCP has successfully returned all matching information. The status is logged.

The possible Association Rejection responses are listed in the Table 75.

Table 75: Association Rejection response

Result	Source	Reason/Diagnosis	Behavior
1 - rejected-permanent	1 - DICOM UL service-user	1 - no-reason-given	The user is notified. If applicable the command will be retried. Log entry.
		2 - application-context-name-not supported	The user is notified. If applicable the command will be retried. Log entry.
		3 - calling-AE-title-not-recognized	The user is notified. If applicable the command will be retried. Log entry.
		7 - called-AE-title-not-recognized	The user is notified. If applicable the command will be retried. Log entry.
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	The user is notified. If applicable the command will be retried. Log entry.
		2 - protocol-version-not-supported	The user is notified. If applicable the command will be retried. Log entry.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	The user is notified. If applicable the command will be retried. Log entry.
		2 - local-limit-exceeded	The user is notified. If applicable the command will be retried. Log entry.

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Result	Source	Reason/Diagnosis	Behavior
2 - rejected-transient	1 - DICOM UL service-user	1 - no-reason-given	The user is notified. If applicable the command will be retried. Log entry.
		2 - application-context-name-not-supported	The user is notified. If applicable the command will be retried. Log entry.
		3 - calling-AE-title-not-recognized	The user is notified. If applicable the command will be retried. Log entry.
		7 - called-AE-title-not-recognized	The user is notified. If applicable the command will be retried. Log entry.
	2 - DICOM UL service-provider (ACSE related function)	1 - no-reason-given	The user is notified. If applicable the command will be retried. Log entry.
		2 - protocol-version-not-supported	The user is notified. If applicable the command will be retried. Log entry.
	3 - DICOM UL service-provider (Presentation related function)	1 - temporary-congestion	The user is notified. If applicable the command will be retried. Log entry.
		2 - local-limit-exceeded	The user is notified. If applicable the command will be retried. Log entry.

4.2.2.3.1. (Real-World) Activity – Print Management as SCU

4.2.2.3.1.1. Description and Sequencing of Activities

Before MR images can be printed, the Print AE must have an open association with the Printer. If no association is opened yet, the operator may initiate an association manually by enabling the selected printer in the “Print Job Control” window, otherwise the Print AE will try to initiate.

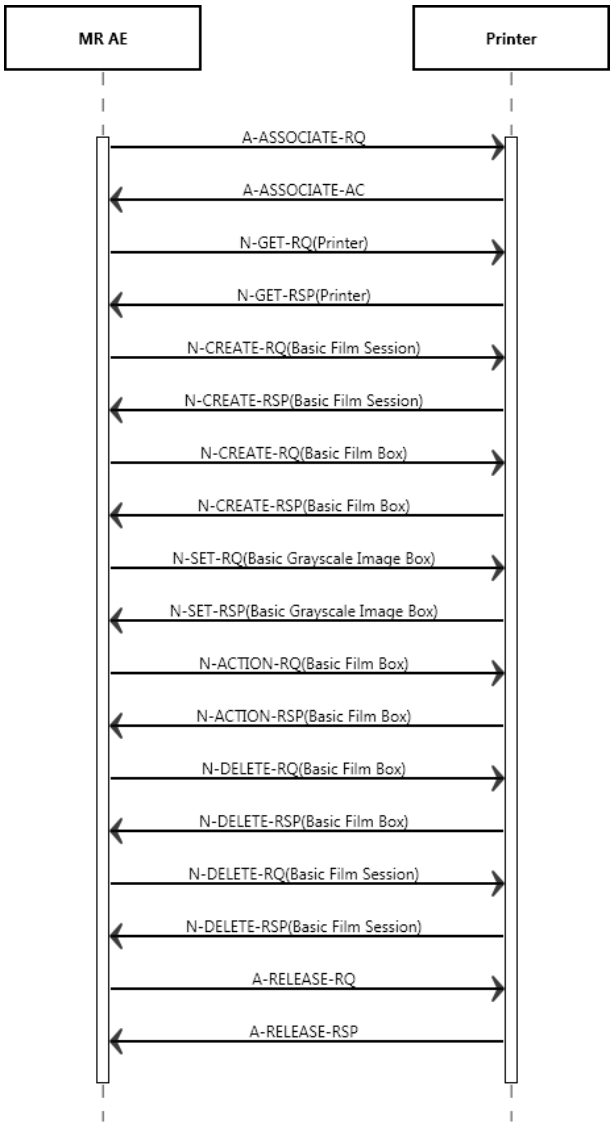

Figure 17: Sequencing of Print Images

Note that the first N-GET message is used to inquire for general printer information, while the second N-GET message is used to inquire for printer status information only.

4.2.2.3.1.2. Proposed Presentation Contexts

The presentation contexts for Print Management as SCU are defined in the table 76.

Table 76: Proposed Presentation Contexts for (Real-World) Activity – Print Management as SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9			SCU	None
>Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

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Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name List**	**UID List**		
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Printer SOP Class	1.2.840.10008.5.1.1.16	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		
>Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
		Explicit VR Little Endian	1.2.840.10008.1.2.1		
		Explicit VR Big Endian	1.2.840.10008.1.2.2		

This section specifies each IOD created (including private IOD's).

Abbreviations used in the Module table for the column "Presence of Value" are:

ALWAYS	The attribute is always present with a value
EMPTY	The attribute is always present without any value (attribute sent zero length)
ANAP	The attribute is present under specified condition – if present then it will always have a value
ANAP	The attribute is present under specified condition – if present then it will not have any value

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
COPY	The attribute value source is another SOP instance
FIXED	The attribute value is hard-coded in the application
IMPLICIT	The attribute value source is a user-implicit setting
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step
MWL	The attribute value source is a Modality Worklist
USER	The attribute value source is explicit user input

4.2.2.3.1.3. SOP Specific Conformance for Basic Film Session SOP Class of the Basic Grayscale Print Management Meta SOP Class

4.2.2.3.1.3.1. Dataset Specific Conformance for Basic Film Session SOP Class N-CREATE-SCU

Table 77 shows the details regarding the Dataset Specific response behavior of Basic Film Session SOP Class N-CREATE-SCU.

Table 77: Basic Film Session Presentation Module

Attribute Name	Tag	VR	Presence of Value	Source	Value and Comment
Number of Copies	2000,0010	IS	ALWAYS	IMPLICIT, USER	Between 1 and 99, applied value: 1
Print Priority	2000,0020	CS	ALWAYS	IMPLICIT	
Medium Type	2000,0030	CS	ALWAYS	IMPLICIT	Applied value: BLUE FILM
Film Destination	2000,0040	CS	ALWAYS	IMPLICIT	
Film Session Label	2000,0050	LO	ALWAYS	IMPLICIT	"Philips Medical Systems"

The possible Status Responses are shown in the Table 78.

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Table 78: Status Response for Basic Film Session N-CREATE-SCU.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Film session successfully created	The print job continues.
Warning	B600	Memory allocation not supported	The print job continues and the warning is logged.

4.2.2.3.1.4. SOP Specific Conformance for Printer SOP Class of the Basic Grayscale Print Management Meta SOP Class

This chapter includes the manufacturer SOP classes and Dataset specific information as well the status codes and their corresponding behavior.

4.2.2.3.1.4.1. Dataset Specific Conformance for Printer SOP Class N-GET-SCU

Detail regarding the Dataset Specific response behavior for N-GET-RQ is reported in Table 79.

Table 79: Printer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ANAP	AUTO	Initial message only.
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	Initial message only.
Device Serial Number	0018,1000	LO		ANAP	AUTO	Initial message only.
Software Version(s)	0018,1020	LO		ANAP	AUTO	Initial message only.
Printer Status	2110,0010	CS		ANAP	AUTO	FAILURE, NORMAL or WARNING. Polling is not supported.
Printer Status Info	2110,0020	CS		ANAP	AUTO	FILM JAM,RECEIVER FULL, SUPPLY EMPTY or SUPPLY LOW
Printer Name	2110,0030	LO		ANAP	AUTO	Initial message only.

The possible Status Responses are listed in Table 80.

Table 80: Status Response for Printer N-GET-SCU.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	The print job continues.
Failed	xxxx	(any warning)	The print job continues and the warning is logged.
Warning	xxxx	(any warning)	The print job is marked as failed; the reason is reported and logged. Eventually the association is released.

4.2.2.3.1.5. SOP Specific Conformance for Basic Film Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

4.2.2.3.1.5.1. Dataset Specific Conformance for Basic Film Box SOP Class N-CREATE-SCU

Detail regarding the Dataset behavior for Basic Film Box SOP Class N-CREATE-SCU is described in Table 81.

Table 81: Basic Film Box Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Display Format	2010,0010	ST	CUSTOM, CUSTOM\1, SLIDE, STANDARD, STANDARD\1,1, SUPERSLIDE	ALWAYS	AUTO	Applied values: COL, CUSTOM, CUSTOM\1, ROW, SLIDE, STANDARD, STANDARD\1,1, SUPERSLIDE
Film Orientation	2010,0040	CS	LANDSCAPE, PORTRAIT	ALWAYS	AUTO	Applied value: PORTRAIT

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Film Size ID	2010,0050	CS	10INX12IN, 10INX14IN, 11INX14IN, 11INX17IN, 14INX14IN, 24CMX24CM, 24CMX30CM	ALWAYS	AUTO	Applied values: 10INX12IN, 10INX14IN, 11INX14IN, 14INX14IN, 14INX17IN, 24CMX24CM, 24CMX30CM, 8INX10IN
Max Density	2010,0130	US		ALWAYS	AUTO	Maximum density of the images on the film, expressed in hundredths of OD. If Min Density is lower than minimum printer density than Min Density is set to minimum printer density.
Trim	2010,0140	CS	NO, YES	ALWAYS	AUTO	Applied value: NO
Configuration Information	2010,0150	ST		ALWAYS	AUTO	LUT

Table 82: Basic Film Box Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Film Session Sequence	2010,0500	SQ		ALWAYS	AUTO	Parent Film Session.
>Referenced SOP Class UID	0008,1150	UI	1.2.840.10008.5.1.1.1	ALWAYS	AUTO	Applied value: 1.2.840.10008.5.1.1.1
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	

The possible Status Responses for Basic Film Box N-CREATE-SCU are shown in Table 83.

Table 83: Status Response

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	The print job continues.
Failed	C616	There is an existing Film Box that has not been printed.	The print job is marked as failed, the reason is logged.
Warning	B605	Requested Min Density or Max Density outside of printer's operating range.	The print job continues and the warning is logged.

4.2.2.3.1.5.2. Dataset Specific Conformance for Basic Film Box SOP Class N-ACTION-SCU

The possible Status Responses are described in Table 84.

Table 84: Status Response for Basic Film Box N-ACTION-SCU.

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation.	The print job continues.
Failed	C602	Unable to create print job SOP instance – print queue is full .	The print job is marked as failed, the reason is reported and logged.
	C603	Image size is larger than image box size.	The print job is marked as failed, the reason is reported and logged.
	C613	Combined print image size is larger than image box size.	The print job is marked as failed, the reason is reported and logged.
Warning	B603	Film Box SOP instance hierarchy does not contain Image Box SOP instances.	The print job continues and the warning is reported and logged.
	B604	Image size is larger than image box size – the image has been de-magnified.	The print job continues and the warning is reported and logged.
	B609	Image size is larger than image box size – the image has been cropped to fit	The print job continues and the warning is reported and logged.
	B60A	Image size or combined print image size is larger than image box size – the image or combined print image has been decimated to fit.	The print job continues and the warning is reported and logged.

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4.2.2.3.1.5.3. Dataset Specific Conformance for Basic Film Box SOP Class N-DELETE-SCU

This sections details the Dataset specific response behavior for the Basic Film Box SOP class N-DELETE-SCU
The possible Status Respons0es are shown in Table 85.

Table 85: Status Response for Basic film Box N-DELETE-SCU

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The status is logged.
Failed	0110	Processing failure	The status is logged.
	0112	No such object instance	The status is logged.
	0117	Invalid object instance	The status is logged.
	0118	No such SOP class	The status is logged.
	0119	Class instance conflict	The status is logged.
	0210	Duplicate invocation	The status is logged.
	0211	Unrecognized operation	The status is logged.
	0212	Mistyped argument	The status is logged.
	0213	Resource limitation	The status is logged.

4.2.2.3.1.6. SOP Specific Conformance for Basic Grayscale Image Box SOP Class of the Basic Grayscale Print Management Meta SOP Class

4.2.2.3.1.6.1. Dataset Specific Conformance for Basic Grayscale Image Box SOP Class N-SET-SCU

Detail regarding the Dataset Specific response behavior of Basic Grayscale Image Box SOP Class N-SET-SCU is reported in this section.

Table 86: Image Box Pixel Presentation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Box Position	2020,0010	US		ALWAYS	AUTO	Applied value: 1
Polarity	2020,0020	CS		ALWAYS	AUTO	Applied value: NORMAL
Basic Grayscale Image Sequence	2020,0110	SQ		ALWAYS	AUTO	
>Samples per Pixel	0028,0002	US	1	ALWAYS	AUTO	Applied value: 1
>Photometric Interpretation	0028,0004	CS	MONOCHROME1	ALWAYS	AUTO	Applied value: MONOCHROME1
>Rows	0028,0010	US		ALWAYS	IMPLICIT	Depending on the selected printer type and film size.
>Columns	0028,0011	US		ALWAYS	IMPLICIT	Depending on the selected printer type and film size.
>Bits Allocated	0028,0100	US	8	ALWAYS	AUTO	Applied value: 8
>Bits Stored	0028,0101	US	8	ALWAYS	AUTO	Applied value: 8
>High Bit	0028,0102	US	7	ALWAYS	AUTO	Applied value: 7
>Pixel Representation	0028,0103	US	0x0000	ALWAYS	AUTO	Applied value: 0x0000
>Pixel Data	7FE0,0010	O W/ OB		ALWAYS	AUTO	

The possible Status Responses are described in Table 87.

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Table 87: Status Response for Basic Grayscale Image Box N-SET-SCU

Service Status	Error Code	Further Meaning	Behavior
Success	0000	Successful operation	The print job continues.
Failed	C603	Image size is larger than image box size	The print job continues and the warning is reported and logged.
	C605	Insufficient memory in printer to store the image	The print job continues and the warning is reported and logged.
	C613	Combined print image size is larger than image box size	The print job continues and the warning is reported and logged.
Warning	B604	Image size is larger than image box size – the image has been de-magnified	The print job continues and the warning is reported and logged.
	B605	Requested Min Density or Max Density outside of printer's operating range	The print job continues and the warning is reported and logged.
	B609	Image size is larger than image box size – the image has been cropped to fit	The print job continues and the warning is reported and logged.
	B60A	Image size or combined print image size is larger than image box size – the image or combined print image has been decimated to fit	The print job continues and the warning is reported and logged.

4.2.2.4. Association Acceptance Policy

The MR System Print AE does not accept any Associations.
Network Interfaces

4.2.3. Physical Network Interfaces

The MR System supports DICOM TCP/IP Network Communication as defined in PS 3.8 of the standard.
No OSI stack communications are provided with this implementation. TCP/IP is the only protocol stack supported.

The MR System supports Ethernet v2.0 and IEEE 802.3, 10/100/1000 Base-T.

The TCP/IP Stack as supported by the underlying Microsoft Windows Operating System.

4.2.4. Additional Protocols

Not applicable

4.2.5. IPv4 and IPv6 Support

MR supports both IPv4 and IPv6.

4.3. Configuration

The configuration of the various DICOM services on the MR system is determined at the time of installation. This can also be changed. This chapter describes all the relevant parameters.

4.3.1. AE Title/Presentation Address Mapping

The DICOM operation of the MR system is configured with the Service Application tool. This tool can be started after logging in to the operating system. It is password protected and intended to be used by Philips Customer Support Engineers only.

4.3.1.1. Local Network settings

The local network settings of the MR system can be made in two ways.

• Automatically via DHCP (hospital provided).
• By assigning a dedicated IP address, subnet mask, gateway and DNS server manually.

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This is determined during the installation of the MR System. It is strongly advised to use only a manually assigned IP address.

The MR System host name is configured via the Computer Name in the MS operating system.

4.3.1.2. Local AE Titles and listen port

The local AE title mapping and configuration is as specified in Table 88.

Table 88: AE Title configuration table

Application Entity	Default AE Title	Default TCP/IP Port
Network AE	NODENAME	104*
Print AE	NODENAME	104*

* The default TCP/IP listen port number for Network AE and Print AE is 104. If needed this listen port number can be changed.

4.3.1.3. Remote AE Title/Presentation Address Mapping

This section describes the configuration of remote DICOM nodes on the MR system.

NOTE: For MOVE to a third node this node must be known at the MR system (that act as SCU) and also at the station that will start the STORE operation, as this information will be used by the MR system in the MOVE command to initiate the STORE action.

Remote Association Acceptors (SCP) Configuration:
All remote DICOM nodes that are able to accept an association from the MR System must be configured on the MR System with the following information:
• IP Address.
• Host name and listen port number.
• AE Title.

Remote Association Initiators (SCU) Configuration:
All remote DICOM nodes that are able to initiate an association with the MR System (that act as SCP) must be configured on the MR System with the following information:
• IP Address.
• Host name and listen port number.
• AE Title.

4.3.2. Configurable parameters

This section describes all the parameters that can be configured on the MR system via the service application tool. These parameters are organized in the following groups:
- Parameters of the local MR AE.
- Parameters for the remote DICOM nodes.
- General Print Parameters.
- Printer Specific Print Parameters.

Table 89: Configuration Parameters Table

Parameter	Configurable	Default Value
Local node Parameters		
Maximum PDU Length (for incoming association) in Bytes	Yes	Default=32768,
Network reply timeout	Yes	3600 sec
Maximum number of incoming associations	Yes	6; must be > 0
Support SOP classes	No	-

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Parameter	Configurable	Default Value
Supported Transfer Syntaxes	No	ELE ILE EBE JPEG Lossless Non-Hierarchical FOP (Process 14) JPEG 2000 Image Compression (Lossless Only) In order in which these are listed above determines the prevalence.
Allow incoming queries?	Yes	Incoming queries are allowed.
ARTIM timeout	Yes	60 sec
DICOM Image Number Direction. This parameter is valid for all export series and reverses the instance numbering.	Yes	Feet to Head (F-H) Left to Right (L-R) Anterior to Posterior (A-P)
Institution name.	Yes	Must be shorter than 64 characters
Automatic association timeout	No	10 sec
Automatic association timeout SCP	No	QR=5sec / RIS=60 sec / other=3600 sec
Remote node Parameters		
Size constraint in maximum object size (see note)	No	-
Maximum PDU Length (for associations initiated on the MR) in Bytes	Yes	32678 Bytes
Network reply timeout	Yes	3600 sec(set to 60 sec for MR Images SOP export)
Supported SOP classes.	Yes	Depends on used template; SOP classes can be configured for sending and receiving.
Supported Transfer Syntaxes	Yes	ELE ILE EBE JPEG Lossless Non-Hierarchical FOP (Process 14) JPEG 2000 Image Compression (Lossless Only) In order in which these are listed above determines the prevalence.
IsArchive	No	If set to Yes then the network node plays role of archive.
Storage Commitment Network Node Name	Yes	Only when 'IsArchive' is Yes; User selects name from a list of configured archive nodes.
Storage Commitment Max. Reply Waiting Time.	Yes	Only when 'IsArchive' is Yes; For asynchronous storage commitment use > 1 sec.
ARTIM timeout	Yes	60 sec
Split multiple day range. Only with RIS template	Yes	No
Pure DICOM. Do not send private attributes: only standard attributes.	Yes	No (= send all attributes)
Combine MR Rescaling for pixel calibration is discarded (combined with window)	Yes	Depends on template; For Philips nodes No, for non-Philips nodes use No only if rescaling is supported for MR Images.
Send logging, for trouble shooting purposes	Yes	No
Receive logging, for trouble shooting purposes	Yes	No
Add group length attributes, for trouble shooting purposes	Yes	No
Splitting Series on export	Yes	This can be configured through template selection. The user can do this during job submission.
General DICOM Print Parameters		
The DICOM printers that may be selected by the operator	Yes	Per template
Printer Specific Print Parameters (Paper)		
Medium Type	Yes	All available
Film Size ID (i.e. Media size)	Yes	All available
Resolution (300 / 600 dpi)	Yes	300 dpi

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Parameter	Configurable	Default Value
Color model (8 Bits color)	Yes	8 Bits
Min. Density	Yes	0
Max. Density	Yes	0

Note that Print parameters can be selected from choice lists. These choice lists are defined via so-called prototypes for each type of printer and print medium. These prototypes are also configurable.

Some remarks to configurable Parameters for Remote Systems:
• The Basic Worklist Management services may be configured for one or more RIS stations.
• The MPPS service may be configured for only one DICOM node.
• If the configuration option "IsArchive" is set to 'Yes' then the following statements are applied:
  - Only complete series can be sent;
  - Storage Commitment will be enabled;
  - A committed study or series will be marked in the Patient Administration UI with “archive” flag set;
  - Query filter must be specified and applied.
• With the MR System it is possible to 'auto-push' the MR images to a selected remote application. Whether or not to auto-push a scan is defined in the scan protocol.

MR Print Configuration:

Configurable per MR System installation:

• DICOM printers to be selected by the operator

Configurable for each defined DICOM printer:
All relevant DICOM printers are defined through selection of one of the available preconfigured templates. Each defined DICOM printer can be fine-tuned (if necessary) through several configurable parameters.
The following list shows all the configurable DICOM printer parameters. Depending on the type of printer not all parameters may be present.
• Medium Type
• Film formats
• Film Destination
• Photometric Interpretation
• Film Size ID
• Film Orientation
• Magnification Type
• Smoothing Type
• Border Density
• Empty image density
• Min. Density
• Max. Density
• Trim
• Configuration Information
• Polarity

The MR System can print to only one DICOM printer at a time.

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5. Media Interchange

5.1. Implementation model

The implementation model identifies the DICOM Application Entities for Media in specific implementation and relates the Application Entities to Real-World Activities.

5.1.1. Application Data Flow Diagram

Figure as below shows the Media Interchange Application Data Flow diagram presenting all of the Application Entities present in an implementation and graphically depicting the relationship of the AE's, use of DICOM to Real-World Activities.

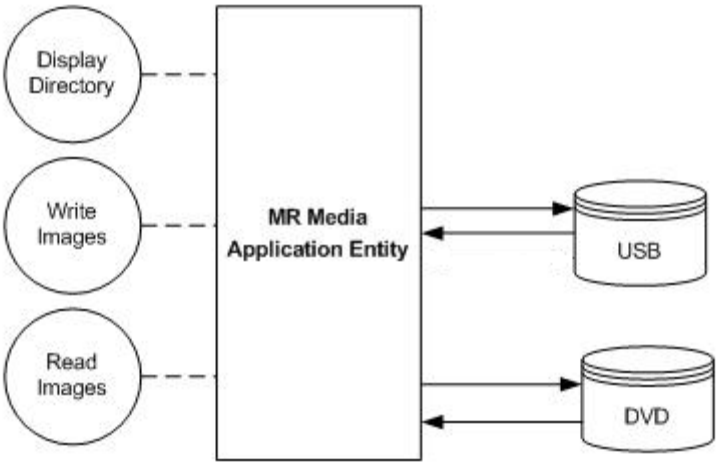

Figure 18: Media Interchange Application Data Flow Diagram

The supported DICOM Media Services are specified in the Table 90.

Table 90: Media Services

Media Storage Application	Write Files (FSC / FSU)	Read Files (FSR)
General Purpose DVD Interchange	YES / NO	YES
General Purpose USB Media Interchange	YES / NO	YES

Table 91: Photometric interpretations supported by the MR AE

Photometric Interpretation	Import	Export	Viewing
RGB (only SC)	YES	YES	YES
MONOCHROME2	YES	YES	YES

Table 92: Transfer Syntaxes of Media supported by the MR AE

Abstract Syntax Name / UID	Transfer Syntax Name	Transfer Syntax UID	Role	Extended Negotiation
Any of the standard image storage and ILE	ELE	1.2.840.10008.1.2.1	SCU	None

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The MR system supports the Media transfer syntax listed in Table 92. The supported transfer syntax is ELE.

5.1.2. Functional Definitions of AE's

The Media AE is the one and only Media Application Entity within the MR System. It includes the following service class.

Media Storage Service Class:
For DVD+RW the Media AE can perform in one or more of the following 3 roles:
- RWA Display Directory (as FSR);
- RWA Read Image (as FSR);
- RWA Write Image (as FSC).

For USB the Media AE can perform in one or more of the following 3 roles:
- RWA Display Directory (as FSR);
- RWA Read Image (as FSR);
- RWA Write Image (as FSC and FSU).

Using initialized media, Write Images can be initiated by selecting the requested images and clicking the media copy button.

5.1.3. Sequencing of Real World Activities

Whenever media has to be written the Media AE first tries to read the DICOMDIR. Then the Media AE will write the images of the selected Examinations and the updated DICOMDIR to the DICOM media.

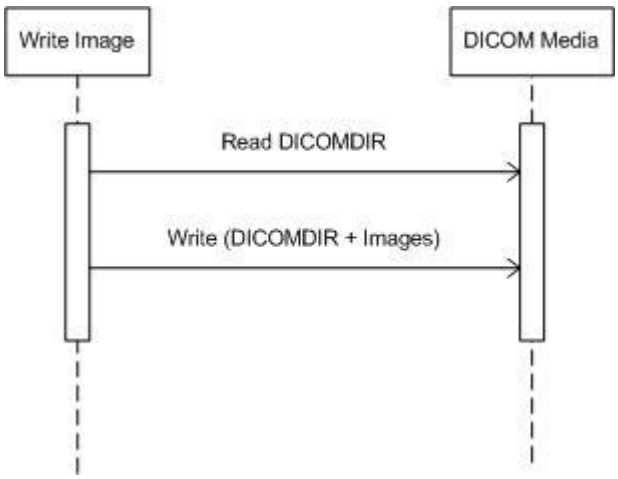

Figure 19: Sequencing of RWA Write Image

5.2. AE Specifications

This section in the DICOM Conformance Statement specifies a set of Media Application Entities.

5.2.1. MR Media AE - Specification

The Media AE provides standard conformance to the DICOM Media Storage Service and File Format ([DICOM] PS 3.10),
Media Storage Application Profiles STD-GEN-DVD-JPEG ([DICOM] PS 3.11), and
Media Storage Application Profiles STD-GEN-USB-JPEG ([DICOM] PS 3.11) for reading and writing.

For one or more Application Profiles, Table 95 shows the Real-World Activities and the roles of each of these Real-World Activities.

Notes:
- Read File-set = Display Directory, Read Image
- Create File-set = Write Image (using ELE only)

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- Update File-set = Write Image (using ELE only)
- Write Image to DVD is DVD+RW only

Table 93: AE MR Media AE related Application Profiles, RWA activities and roles

Supported Application Profile	Identifier	Real-World Activities	Roles
CT/MR Studies on DVD Media	STD-CTMR-DVD	Create File-set	FSC
		Read File-set	FSR
General Purpose USB Media Interchange with JPEG	STD-GEN-USB-JPEG	Update File-set	FSU
		Create File-set	FSC
		Read File-set	FSR

5.2.1.1. File Meta Information for the MR Media AE

The Implementation Class UID and the Implementation Version Name in the File Meta Header are as specified for networking.

The Media AE has no specific File Meta Information.

The following values are assigned to the File Meta Information attributes (see also PS 3.10) that pertain to the Implementation Class and Version.

Table 94: File Meta Information for the MR Media AE

Implementation Class UID	1.3.46.670589.11.0.0.51.4.54.0
Implementation Version Name	Philips MR 54.0

5.2.1.2. Real-World Activities

The AE specification contains a description of the Real-World Activities, which invoke the particular AE.

5.2.1.2.1. RWA - Read File-set

The Media AE supports the FSR (File Set Reader) role to interchange stored data on DICOM media. (Display Directory and Read Image).

Display Directory:

When a database open action is initiated on the media then the Media AE acts as an FSR using the interchange option to read the DICOMDIR of the medium.
The MR System will act as a FSR when reading the directory (DICOMDIR) of the medium. This allows the System Integrator to see the results in an overview of the patients, studies, series presentation states and images.

The MR system will not access DICOM media when either:
- Patient ID is absent; or
- Study Instance UID has no value; or
- Series Instance UID has no value.

Read Images

The MR System Media AE will act as a FSR when reading all images of the selected Examinations from DICOM media. Only images made on a Philips MR System will be imported again; these imported images are to be used for reference only, it is not intended to export them again. Images without the Philips private attributes are not imported.

5.2.1.2.1.1. Media Storage Application Profile

This chapter refers to the related Application Profiles in the table in section 5.2.1.

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5.2.1.2.1.1.1. Options

Display Directory

The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series and Image.

Read Image

The mandatory attributes of the DICOM images are required for the successfully storage of the images in the MR System internal image database. For conformance see section 8.

5.2.1.2.2. RWA - Create File-set

This Media Application Entity has a File-set Creator functionality which is described here.

Write Images

The Media AE acts as an FSC when writing DICOM objects onto DICOM media. The Media AE can also store private attributes. The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, a generated dummy value will be filled in.

5.2.1.2.2.1. Media Storage Application Profile

This chapter refers to the related Application Profiles in the table in section 5.2.1.

5.2.1.2.2.1.1. Options

Implementation remarks and restriction:

• When writing the DICOMDIR records the following key values are generated if no value of the corresponding attribute is supplied:
  - Patient ID;
  - Study ID;
  - Study Instance UID;
  - Series Number;
  - Series Instance UID;
  - Image Number;
  - SOP Instance UID.

• The mechanism of generating a value for Patient ID creates each time a new value based on Patient's Name for each new study written to DICOM media, even if this study belongs to a patient recorded earlier.

• The default value for the Pixel Intensity Relationship (0028,1040) is set to DISP.

• A number of attributes (e.g., Window Width and Window Centre) can be formatted as floating point numbers.

5.2.1.2.3. RWA - Update File-set

This Media Application Entity supports the File-set Updater functionality (FSU) for USB only.

The Media AE supports the FSU role to interchange stored data on DICOM media (Write Image).

The mandatory DICOMDIR keys are required for the correct display of directory information. The display is structured according the DICOM Composite Information Model: Patient, Study, Series and Image.

When the medium contains a DICOM file-set then the Media AE acts as a FSU. Thus it can merge new objects into the existing file-set or can remove objects from that file-set.

5.2.1.2.3.1. Media Storage Application Profile

The Media AE will act as a FSC or FSU when writing all images of the selected Examinations onto the DICOM media.

The MR System Media AE will act as a FSC when writing all images of the selected Examinations to DICOM media. All Images made on an MR System can be exported. This results in writing the patients, studies, series and images on the MR System to the DICOM medium.

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5.2.1.2.3.1.1. Options

The mandatory DICOM attributes are verified before accepting imported SOP instances.

The DICOMDIR file will be extended when new images are written. In case some attributes are not present in the images but are specified Mandatory in the DICOMDIR definition in DICOM Media, a generated dummy value will be filled in.

Implementation remarks and restriction:

- When writing the DICOMDIR records the following key values are generated if no value of the corresponding attribute is supplied:
  - Patient ID;
  - Study ID;
  - Study Instance UID;
  - Series Number;
  - Series Instance UID;
  - Image Number;
  - SOP Instance UID.
- The mechanism of generating a value for Patient ID creates each time a new value based on Patient's Name for each new study written to DICOM media, even if this study belongs to a patient recorded earlier.

5.3. Augmented and Private Application Profiles

Not applicable

5.4. Media Configuration

Not Applicable.

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6. Support of Character Sets

Any support for character sets in Network and Media services is described here.

Table 95: Supported DICOM Character Sets

Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
Latin alphabet No. 1	ISO 2022 IR 100	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
			ISO-IR 100	G1	Supplementary set of ISO 8859
Latin alphabet No. 2	ISO 2022 IR 101	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
			ISO-IR 101	G1	Supplementary set of ISO 8859
Latin alphabet No. 3	ISO 2022 IR 109	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
			ISO-IR 109	G1	Supplementary set of ISO 8859
Latin alphabet No. 4	ISO 2022 IR 110	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
			ISO-IR 110	G1	Supplementary set of ISO 8859
Japanese	ISO 2022 IR 13	ESC 02/08 04/10	ISO-IR 14	G0	JIS X 0201: Romaji
			ISO-IR 13	G1	JIS X 0201: Katakana
Latin alphabet No. 5	ISO 2022 IR 148	ESC 02/08 04/02	ISO-IR 6	G0	ISO 646
			ISO-IR 148	G1	Supplementary set of ISO 8859
Korean	ISO 2022 IR 149	-	ISO-IR 149	G1	KS X 1001: Hangul and Hanja
			-	-	-
Japanese	ISO 2022 IR 159	-	ISO-IR 159	G0	JIS X 0212: Supplementary Kanji set
			-	-	-
Japanese	ISO 2022 IR 87	-	ISO-IR 87	G0	JIS X 0208: Kanji
			-	-	-
Latin alphabet No. 1	ISO_IR 100	-	ISO-IR 6	G0	ISO 646
			ISO-IR 100	G1	Supplementary set of ISO 8859
Latin alphabet No. 2	ISO_IR 101	-	ISO-IR 6	G0	ISO 646
			ISO-IR 101	G1	Supplementary set of ISO 8859
Latin alphabet No. 3	ISO_IR 109	-	ISO-IR 6	G0	ISO 646
			ISO-IR 109	G1	Supplementary set of ISO 8859
Latin alphabet No. 4	ISO_IR 110	-	ISO-IR 6	G0	ISO 646
			ISO-IR 110	G1	Supplementary set of ISO 8859
Greek	ISO_IR 126	-	ISO-IR 6	G0	ISO 646
			ISO-IR 126	G1	Supplementary set of ISO 8859
Japanese	ISO_IR 13	-	ISO-IR 14	G0	JIS X 0201: Romaji
		-	ISO-IR 13	G1	JIS X 0201: Katakana
Cyrillic	ISO_IR 144	-	ISO-IR 6	G0	ISO 646

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Character Set Description	Defined Term	ESC Sequence	ISO Registration Number	Code Element	Character Set
		-	ISO-IR 144	G1	Supplementary set of ISO 8859
Latin alphabet No. 5	ISO_IR 148	-	ISO-IR 6	G0	ISO 646
			ISO-IR 148	G1	Supplementary set of ISO 8859
Default repertoire	-	-	ISO-IR 6	G0	ISO 646
GB18030	GB18030	-	-	-	-
Unicode in UTF-8	ISO_IR 192	-	-	-	-

The default character set for the MR System is ISO_IR 100. If nothing is defined the MR system assumes ISO-IR 6, as per DICOM Standard.

When an unsupported character is received it shall be tried and decoded according the default repertoire. Otherwise unsupported characters shall be displayed as "?".
The MR System supports Japanese character sets only for use in the Patient's Name attribute (0010,0010).
Internally the MR System only uses Unicode characters. This implies that text will be displayed as Unicode too.

If the MR System receives a Specific Character Set that is not supported then the related association will be aborted.
However, if a RIS worklist contains a Specific Character Set attribute that is not empty and not supported according to Table 98 then the MR System will send a C-CANCEL request to the RIS and a "RIS ERROR" message will be displayed; the MR System will reject the RIS import.

The Print AE provides no support for extended character sets in the communication with DICOM SCP's.

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7. Security

7.1. Security Profiles

If configured MR System supports the following security measures:
• Confidentiality of data on DICOM Media.
• Time Synchronization Profile.

7.1.1. Security use Profiles

Not applicable

7.1.2. Security Transport Connection Profiles

Not applicable

7.1.3. Digital Signature Profiles

Not applicable

7.1.4. Media Storage Security Profiles

Not applicable

7.1.5. Attribute Confidentiality Profiles

The MR System conforms to the Basic Application Level Confidentiality Profile as a de-identifier without encryption. This functionality is targeted toward creating a special purpose, de-identified version of an already-existing Data Set. The de-identified SOP Instances are useful, for example, in creating teaching or research files, where the identity of the patient should be protected.
The MR System does not create instances of the Encrypted Attributes Data Set, therefore, reconstruction of the original Data Set will not be possible.
Table 96 presents all attributes that can be de-identified by the MR System. Each Attribute to be protected has its value replaced by a different “replacement value” which does not allow identification of the patient. Integrity of dummy values for references (such as SOP Instance UID, etc.) if multiple SOP instances are protected is ensured within the scope of one job.
The MR System does not ensure that identifying information that is burned in to the image pixel data is “blackened” (removed).

Table 96 specifies the attributes that are modified when de-identification is performed (Suppression). De-identification is only applicable when it concerns writing to DVD Media, so DVD+RW and USB/file.

Table 96: Basic Application Level Confidentiality Profile Attributes

Attribute Name	Tag	VR	Replacement Value
Patient Name	0010,0010	PN	Emptied/Value entered by user
Patient Age	0010,1010	AS	Removed
Patient ID	0010,0020	LO	Altered
Patient’s Birth Date	0010,0030	DA	Changed to year0101; if older than 90 years, date will be set to 1-1-1800
Patient's Sex	0010,0040	CS	Altered/Emptied((M/F remain as is; if O, then attribute emptied)
Other Patient Ids	0010,1000	LO	Removed
Patient Weight	0010,1030	DS	Altered(displayed as LBS and stored as kg) Rounded to nearest of 5
Medical Alerts	0010,2000	LO	Removed
Allergies	0010,2110	LO	Removed
Pregnancy Status	0010,21C0	US	Removed
Additional Patient's History	0010,21B0	LT	Removed

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Attribute Name	Tag	VR	Replacement Value
Patient Comments	0010,4000	LT	Removed
Instance Creator UID	0008,0014	UI	Altered
SOP Instance UID	0008,0018	UI	Altered
Study Date	0008,0020	DA	Changed to year0101
Series Date	0008,0021	DA	Changed to year0101
Acquisition Date	0008,0022	DA	Changed to year0101
Content Date	0008,0023	DA	Changed to year0101
Acquisition Datetime	0008,002A	DT	Changed to year0101
Accession Number	0008,0050	SH	Emptied
Institution Name	0008,0080	LO	Removed
Institution Address	0008,0081	ST	Removed
Referring Physician’s Name	0008,0090	PN	Emptied
Code Meaning	0008,0104	LO	Altered/Removed
Device Serial Number	0008,1000	LO	Removed
Station Name	0008,1010	SH	Removed
Study Description	0008,1030	LO	Removed
Series Description	0008,103E	LO	Removed
Institutional Department Name	0008,1040	LO	Removed
Performing Physician’s Name	0008,1050	PN	Removed
Operators' Name	0008,1070	PN	Removed
Admitting Diagnoses Description	0008,1080	LO	Removed
Referenced SOP Instance UID	0008,1155	UI	Altered
Date of Secondary Capture	0018,1012	LO	changed to year0101
Protocol Name	0018,1030	LO	Unchanged
Study ID	0020,0010	SH	Unchanged
Study Instance UID	0020,000D	UI	Altered
Series Instance UID	0020,000E	UI	Altered
Frame of Reference UID	0020,0052	UI	Altered
Image Comments	0020,4000	LT	Emptied
Requesting Physician	0032,1032	PN	Removed
Requesting Service	0032,1033	LO	Removed
Study Comments	0032,4000	LT	Removed
Scheduled Performing Physician	0040,0006	PN	Emptied
Scheduled Performing Step Description	0040,0007	LO	Removed
Performed Procedure Step Start Date	0040,0244	DA	Altered
Performed Procedure Step End Date	0040,0250	DA	Altered
Comments on the Performed Procedure Step	0040,0280	ST	Removed
Requested Procedure Comments	0040,1400	LT	Removed
Imaging Service Request Comments	0040,2400	LT	Removed
Instance Creation Date	0008,0012	DA	Altered
Instance Creation Time	0008,0013	TM	Altered
Study Time	0008,0030	TM	Unchanged
Series Time	0008,0031	TM	Unchanged
Acquisition Time	0008,0032	TM	Unchanged
Content Time	0008,0033	TM	Unchanged
Ethnic Group	0010,2160	SH	Removed
Occupation	0010,2180	SH	Removed
Frame Acquisition DateTime	0018,9074	DT	Altered
Frame Reference DateTime	0018,9151	DT	Altered

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Attribute Name	Tag	VR	Replacement Value
Special Needs	0038,0050	LO	Removed
Patient State	0038,0500	LO	Removed

The terms used to describe the replacement values can be read as follows:

Table 97: Mapping replacements

Term	Description
Emptied	The attribute will have a value of zero length
N.A.	Not Applicable, the attribute is not contained in the standard IOD of MR System
Altered	The original value is irreversible encrypted onto a syntactically valid DICOM UID
Copy	Attribute value is copied from original attribute value

7.1.6. Network Address Management Profiles

Not applicable

7.1.7. Time Synchronization Profiles

MR System conforms to the Basic Time Synchronization Profile as NTP client.

7.1.8. Application Configuration Management Profiles

Not applicable

7.1.9. Audit Trail Profiles

Not applicable

7.2. Association Level Security

The MR System accepts associations only from known applications or an application whose “calling AE Title” is defined in its configuration file. The MR System will reject association requests from unknown applications, i.e. applications that offer an unknown “calling AE title”. An application entity (AE) is known if – and only if – it is defined during configuration of the MR System, which is done via the configuration application.

7.3. Application Level Security

The MR System allows the use of either a conventional (non-secure) DICOM communication or a secure DICOM communication based on the Transport Layer Security (TLS) protocol [TLS]. If configured, the MR System supports security measures for:

1. secure authentication of a node
2. integrity and confidentiality of transmitted data
3. replay protection
4. generation of audit trail records
5. access control and user authentication.

7.3.1 DICOM Basic TLS Secure Transport Connection Profile

Secure communication is a “mode of operation” of the MR System supported by the implementation of the DICOM Basic TLS Secure Transport Connection Profile. This functionality will be used by the nodes that can authenticate each other before they exchange DICOM information. For secure communication the TLS protocol v1.0 is used which provides message authentication, integrity, confidentiality, and replay protection. Confidentiality is optional and can be controlled by the encryption settings.
The MR System may communicate using the following Cipher Suites:

1. TLS_RSA_WITH_NULL_SHA (Node authentication without encryption)

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2. TLS_RSA_WITH_3DES_SHA (Node authentication with encryption)

The MR System supports X.509 certificates. The following TLS Certification checks will be done (TLS Handshake). The machine (either server or client) that will send its certificate will:

1. Choose the certificate according to Common Name (CN) value in the Subject-field. This name is case-sensitive. All present certificates should have unique CN names.
2. The server verifies
   - that the client certificate is a X.509 certificate which is not tampered with
   - that the client certificate is in the list of trusted certificates
   - that the client certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
   - that the client certificate has the correct purpose (at least the Client Authentication purpose)
3. The client verifies
   - that the server certificate is a X.509 certificate which is not tampered with
   - that the server certificate is in the list of trusted certificates
   - that the server certificate is not expired (present time is between "Valid From" and "Valid To" fields of the X.509 certificate)
   - that the server certificate has the correct purpose (at least Server Authentication purpose)

No verification is done on:

- revocation of certificates
- limiting the connection to a limited set of IP-addresses.

Node authentication with or without encryption is only possible when both nodes have:

- an access to their own private keys
- an access to a copy of the certificate of the other node containing its public key

The MR System can only read certificates from the certificate stores of the HKEY_LOCAL_MACHINE registry key. It is the responsibility of the Hospital to setup and maintain the certificate stores. This includes the removal of revoked certificates and certificate updates prior to their expiration. Since neither X.500 directories, Lightweight Directory Access Protocol (LDAP) nor Certificate Revocation Lists (CRLs) are supported, the whole certificate chain needs to be replaced after a security breach. Figure 19 presents the message flow of TLS handshake supported by the MR System.

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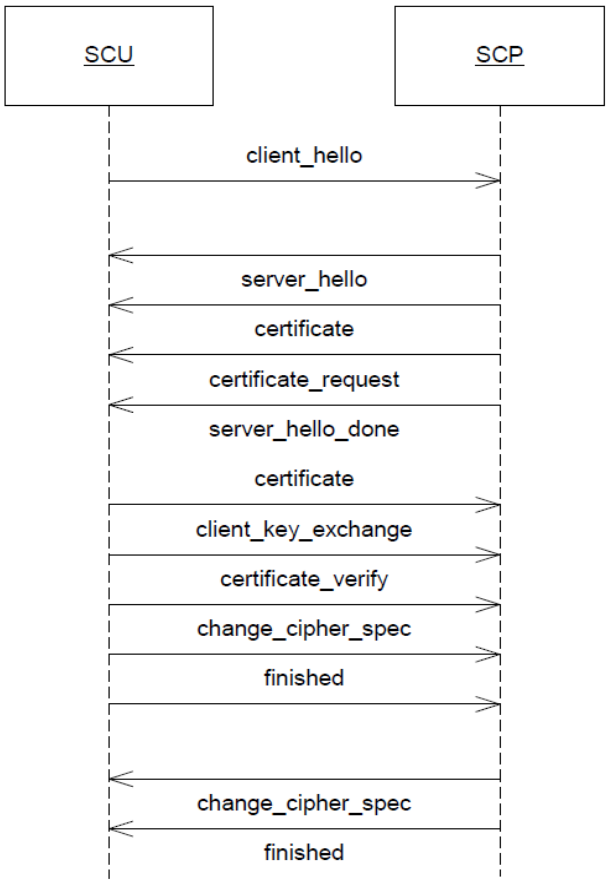

Figure 20 Message flow of TLS handshake

7.3.2 Generation of Audit Records

The MR System can create audit messages according to the IHE Basic Security Integration Profile [IHE] to audit activities, to detect non-compliant behavior in the enterprise, and to facilitate detection of improper creation, access, modification and deletion of Protected Health Information (PHI). These messages may contain information that identifies the patient. The following messages will be created and sent to a central Audit Record Repository according to the Syslog protocol [SYSLOG]:

- ActorConfig (when security or networking configuration of the MR System is modified via the field service functionality)
- ActorStartStop (when the MR System starts or shuts down)
- Export (when an examination is saved to a file for field service purposes or printed on a film/paper)
- BeginStoringInstances (when an examination is transferred from the MR System to a remote network node)
- DICOMInstancesDeleted (when an examination is deleted and it is not scheduled, prepared, or imported)
- DICOMInstancesUsed (when an examination is selected for acquisition)
- UserAuthenticated (when the user logs in or logs out)
- SecurityAlert (when an authentication of a secure node during TLS negotiation [TLS] fails, e.g. Due to an invalid certificate)

If the central Audit Record Repository is not available, the audit trail record will be stored by the MR System in a local buffer. Once the central Audit Record Repository is available again, the content of that buffer will be transferred to the central Audit Record Repository. The time that is part of the audit message will be the local time of the MR System. This time will be synchronized with a Time Server. The Time Server and central Audit Record Repository are elements of the Hospital infrastructure.

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8. Annexes of application "MR System Network AE"

8.1. IOD Contents

8.1.1. Created SOP Instance

This section specifies each IOD created by this application.

Used abbreviations are:
For module and macro Usage

ALWAYS	the module is always present
CONDITIONAL	the module is used under specified condition

For attribute Definition
The first value is about the presence of the attribute and the next value(s) tell something about the source. In case the source contains multiple values, then either one of these may be applicable depending on the use of the system.

This section specifies each IOD created (including private IOD's). It should specify the attribute name, tag, VR, and value. The value should specify the range and source (e.g. user input, Modality Worklist, automatically generated, etc.). For content items in templates, the range and source of the concept name and concept values should be specified. Whether the value is always present or not shall be specified.
Abbreviations used in the IOD tables for the column "Presence of Module" are:

ALWAYS	The module is always present
CONDITIONAL	The module is used under specified condition Abbreviations used in the Module table for the column "Presence of Value" are:
ALWAYS	The attribute is always present with a value
EMPTY	The attribute is always present without any value (attribute sent zero length)
ANAP	The attribute is present under specified condition – if present then it will always have a value
ANAP	The attribute is present under specified condition – if present then it will not have any value

The abbreviations used in the Module table for the column "Source" are:

AUTO	The attribute value is generated automatically
CONFIG	The attribute value source is a configurable parameter
COPY	The attribute value source is another SOP instance
FIXED	The attribute value is hard-coded in the application
IMPLICIT	The attribute value source is a user-implicit setting
MPPS	The attribute value is the same as that use for Modality Performed Procedure Step
MWL	The attribute value source is a Modality Worklist
USER	The attribute value source is explicit user input

8.1.1.1. List of created SOP Classes

Table 98: List of created SOP Classes

SOP Class Name	SOP Class UID
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4
Media Storage Directory SOP Class	1.2.840.10008.1.3.10

8.1.1.2. CT Image Storage SOP Class

Table 99: IOD of Created CT Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Plane Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	CT Image Module	ALWAYS
Image	VOI LUT Module	CONDITIONAL
Image	SOP Common Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 100: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	-
Patient ID	0010,0020	LO		ALWAYS	MWL, USER	-
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	-
Patient's Sex	0010,0040	CS		ALWAYS	MWL, USER	-
Patient Comments	0010,4000	LT		ANAP	MWL	Only present when patient demographics received from RIS.
Ethnic Group	0010,2160	SH		ANAP	MWL	Only present when patient demographics received from RIS.
Patient Comments	0010,4000	LT		ANAP	MWL	Only present when patient demographics received from RIS.

Table 101: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO, MWL	-
Study Time	0008,0030	TM		ALWAYS	AUTO, MWL	-
Accession Number	0008,0050	SH		ALWAYS	AUTO, MWL, USER	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	-
Study Description	0008,1030	LO		VNAP	MWL, USER	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL	-
Study ID	0020,0010	SH		ALWAYS	AUTO	-

Table 102: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		VNAP	MWL	-
Patient's Size	0010,1020	DS		VNAP	AUTO	-

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Patient's Age	0010,1010	AS		ANAP	COPY	
Patient's Weight	0010,1030	DS		ALWAYS	MWL, USER	-
Occupation	0010,2180	SH		ANAP	MWL	Only present when patient demographics received from RIS.
Additional Patient History	0010,21B0	LT		VNAP	MWL	-

Table 103: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	
Series Time	0008,0031	TM		ALWAYS	AUTO	
Modality	0008,0060	CS	CT	ALWAYS	FIXED	
Series Description	0008,103E	LO		ANAP	AUTO, USER	
Operators' Name	0008,1070	PN		EMPTY	FIXED	
Body Part Examined	0018,0015	CS		ANAP	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	USER	
Patient Position	0018,5100	CS		ALWAYS	AUTO	
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	
Series Number	0020,0011	IS		ALWAYS	AUTO	
Laterality	0020,0060	CS		ANAP	USER	
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	
Performed Procedure Step Description	0040,0254	LO		VNAP	MWL, USER	
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	AUTO, MWL, USER	
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Coding Scheme Designator	0008,0102	SH		ANAP	MWL	-
Performing Physicians' Name	0008,1050	PN		ANAP	AUTO	
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	
>Instance Creation Date	0008,0012	DA		ANAP	AUTO	
>Instance Creation Time	0008,0013	TM		ANAP	AUTO	
>Instance Creator UID	0008,0014	UI		ANAP	AUTO	
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	AUTO, MWL, USER	

Table 104: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	-
Position Reference Indicator	0020,1040	LO		EMPTY	FIXED	-

Table 105: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	FIXED	Applied value: Philips
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Configured on the system.
Institution Address	0008,0081	ST		ANAP		

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Station Name	0008,1010	SH		ALWAYS	CONFIG	Same as the Host Name.
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-
Manufacturer's Model Name	0008,1090	LO		ALWAYS	FIXED	
Device Serial Number	0018,1000	LO		ALWAYS	FIXED	System serial number.
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	The release text of the original Image.

Table 106: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	DERIVED\PRIMARY\REFORMATTED\REFORMATTED\DERIVED	ANAP	AUTO	-
Acquisition Date	0008,0022	DA		ANAP	AUTO	-
Content Date	0008,0023	DA		ANAP	AUTO	-
Acquisition Time	0008,0032	TM		ANAP	AUTO	-
Content Time	0008,0033	TM		ANAP	AUTO	-
Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	-
> Referenced SOP Class UID	0008,1150	UI		ALWAYS	IMPLICIT	-
> Referenced SOP Instance UID	0008,1155	UI		ALWAYS	IMPLICIT	-
Acquisition Number	0020,0012	IS		ANAP	AUTO	
Instance Number	0020,0013	IS		VNAP	AUTO	
Image Comments	0020,4000	LT		ANAP	AUTO	
Lossy Image Compression	0028,2110	CS	00	ANAP	AUTO	Never Compressed.
Presentation LUT Shape	2050,0020	CS		ANAP	AUTO	

Table 107: Image Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Slice Thickness	0018,0050	DS		VNAP	AUTO	-
Image Position (Patient)	0020,0032	DS		ALWAYS	AUTO	-
Image Orientation (Patient)	0020,0037	DS		ALWAYS	AUTO	-
Slice Location	0020,1041	DS		ANAP	AUTO	-
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	-

Table 108: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US	1	ALWAYS	FIXED	
Photometric Interpretation	0028,0004	CS	MONOCHROME	ALWAYS	FIXRD	
Rows	0028,0010	US		ALWAYS	IMPLICIT	
Columns	0028,0011	US		ALWAYS	IMPLICIT	
Bits Allocated	0028,0100	US	16	ALWAYS	FIXED	
Bits Stored	0028,0101	US	12	ALWAYS	IMPLICIT	
High Bit	0028,0102	US	11	ALWAYS	IMPLICIT	
Pixel Representation	0028,0103	US	0	ALWAYS	IMPLICIT	
Pixel Data	7FE0,0010	OB	IN FILE	ANAP	IMPLICIT	

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Table 109: CT Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS	DERIVED\PRIMARY\REFORMATTED\REFORMATTED\DERIVED	ALWAYS	AUTO	
Scan Options	0018,0022	CS	OTHER	ANAP	AUTO	Always OTHER
KVP	0018,0060	DS	0	VNAP	FIXED	Derived from MR image so no KVP
Data Collection Diameter	0018,0090	DS	0	ANAP	FIXED	This refers to the physical properties of the CT device (or scan), and as the data is derived from an MR scan. It is defined as 0 (zero)
Reconstruction Diameter	0018,1100	DS		ANAP	AUTO	
Gantry/Detector Tilt	0018,1120	DS	0	ANAP	FIXED	
Filter Type	0018,1160	SH		ANAP	FIXED	
Focal Spot	0018,1190	DS	0	ANAP	AUTO	
Acquisition Number	0020,0012	IS		VNAP	AUTO	
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	AUTO	
Bits Allocated	0028,0100	US		ALWAYS	AUTO	
Bits Stored	0028,0101	US		ALWAYS	AUTO	
High Bit	0028,0102	US		ALWAYS	AUTO	
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	
Rescale Slope	0028,1053	DS	1	ALWAYS	AUTO	
Rescale Type	0028,1054	LO	HU	ANAP	FIXED	

Table 110: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ANAP	AUTO	
Window Width	0028,1051	DS		ANAP	AUTO	
Window Center & Width Explanation	0028,1055	LO		ANAP	AUTO	

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Table 111: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ANAP	AUTO	Default: ISO_IR 6
Instance Creation Date	0008,0012	DA		ANAP	AUTO	
Instance Creation Time	0008,0013	TM		ANAP	AUTO	
Instance Creator UID	0008,0014	UI		ANAP	AUTO	
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	
Instance Number	0020,0013	IS		ANAP	AUTO	

8.1.1.3. Enhanced MR Image Storage SOP Class

Table 112: IOD of Created Enhanced MR Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Series	MR Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	Enhanced General Equipment Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	Acquisition Context Module	ALWAYS
Image	Multi-frame Functional Groups Module (Enhanced MR Image)	ALWAYS
Image	Multi-frame Dimension Module	ALWAYS
Image	Cardiac Synchronization Module	CONDITIONAL
Image	Respiratory Synchronization Module	CONDITIONAL
Image	Bulk Motion Synchronization Module	CONDITIONAL
Image	Enhanced MR Image Module	ALWAYS
Image	MR Pulse Sequence Module	CONDITIONAL
Image	Supplemental Palette Color Table Lookup Module	CONDITIONAL
Image	SOP Common Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 113: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	-
Patient ID	0010,0020	LO		ALWAYS	MWL, USER	-
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	-

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Other Patient IDs	0010,1000	LO		ANAP	MWL	Only present when patient demographics received from RIS
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	Only present when patient demographics received from RIS
Patient Comments	0010,4000	LT		ANAP	MWL	Only present when patient demographics received from RIS

Table 114: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO	-
Accession Number	0008,0050	SH		ALWAYS	AUTO, MWL, USER	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	-
Study Description	0008,1030	LO		ANAP	MWL, USER	-
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL, USER	-
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>Context Identifier	0008,010F	CS		ANAP	MWL	-
Referenced Study Sequence	0008,1110	SQ		ANAP	AUTO, MWL	As received from RIS or else default.
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO, MWL	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO, MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL	-
Study ID	0020,0010	SH		ALWAYS	AUTO	-

Table 115: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		VNAP	MWL	-
Patient's Size	0010,1020	DS		VNAP	MWL	-
Patient's Weight	0010,1030	DS		ALWAYS	MWL, USER	-
Occupation	0010,2180	SH		ANAP	MWL	Only present when supplied by the RIS.
Additional Patient History	0010,21B0	LT		VNAP	MWL	-

Table 116: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Series Description	0008,103E	LO		ANAP	AUTO, USER	-
Operators' Name	0008,1070	PN		EMPTY	FIXED	-
Body Part Examined	0018,0015	CS		ANAP	AUTO	
Protocol Name	0018,1030	LO		ALWAYS	USER	Scan name.
Patient Position	0018,5100	CS		ALWAYS	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Generated by MR system.

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Series Number	0020,0011	IS		ALWAYS	AUTO	Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number.
Laterality	0020,0060	CS		ANAP	USER	-
Request Attributes Sequence	0040,0275	SQ		VNAP	MWL	Only present when patient demographics received from RIS
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	-
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL, USER	-
>>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>>Context Group Version	0008,0106	DT		ANAP	MWL	-
>>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>>Context Group Extension Flag	0008,010B	CS		ANAP	MWL	-
>>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>>Context Identifier	0008,010F	CS		ANAP	MWL	-
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	MWL	-
>Requested Procedure ID	0040,1001	SH		ALWAYS	MWL	-
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	-
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	-
Performed Procedure Step Description	0040,0254	LO		VNAP	MWL, USER	-
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	MWL, USER	
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>Context Identifier	0008,010F	CS		VNAP	MWL	-
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL, USER	Only present when patient demographics received from RIS. Maximum of 64 characters.

Table 117: MR Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	FIXED	MR

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Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	Applied value: 1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-

Table 118: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	-
Position Reference Indicator	0020,1040	LO		EMPTY	FIXED	-

Table 119: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	CONFIG	-
Institution Name	0008,0080	LO		ANAP	CONFIG	Configured in the system
Station Name	0008,1010	SH		ALWAYS	CONFIG	Same as the Hostname
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-

Table 120: Enhanced General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	FIXED	Applied value: Philips
Manufacturer's Model Name	0008,1090	LO		ALWAYS	FIXED	
Device Serial Number	0018,1000	LO		ALWAYS	FIXED	System serial number
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	The release text of the original Image.

Table 121: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	
Columns	0028,0011	US		ALWAYS	AUTO	
Pixel Aspect Ratio	0028,0034	IS	Value 1: 1	ANAP	AUTO	Applied value: (1,1)
Pixel Representation	0028,0103	US	0	ALWAYS	AUTO	Applied value: 0000
Pixel Data	7FE0,0010	O W/ OB		ALWAYS	AUTO	-

Table 122: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		EMPTY	FIXED	-

Table 123: Multi-frame Functional Groups Module (Enhanced MR Image)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Number of Frames	0028,0008	IS		ALWAYS	AUTO	-
Shared Functional Groups Sequence	5200,9229	SQ		ALWAYS	AUTO	Always present in combination with the Per-frame Functional Groups Sequence (5200,9230)
>Pixel Measures Sequence	0028,9110	SQ		ALWAYS	AUTO	-

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>>Slice Thickness	0018,0050	DS		ANAP	AUTO	-
>>Pixel Spacing	0028,0030	DS		ANAP	AUTO	-
>Plane Position Sequence	0020,9113	SQ		ALWAYS	AUTO	-
>>Image Position (Patient)	0020,0032	DS		ANAP	AUTO	-
>Plane Orientation Sequence	0020,9116	SQ		ALWAYS	AUTO	-
>>Image Orientation (Patient)	0020,0037	DS		ANAP	AUTO	-
>Cardiac Synchronization Sequence	0018,9118	SQ		ANAP	AUTO	-
>>Nominal Cardiac Trigger Delay Time	0020,9153	FD		ALWAYS	AUTO	-
>>R - R Interval Time Nominal	0020,9251	FD		ANAP	AUTO	-
>Pixel Value Transformation Sequence	0028,9145	SQ		ALWAYS	AUTO	-
>>Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	-
>>Rescale Slope	0028,1053	DS		ALWAYS	AUTO	-
>>Rescale Type	0028,1054	LO	Normalized, US, cm/s, mrad, ms, mm^2/s, s,%,/s, S/m, kPa, mmol, ppm, Hz, um^2/sec, 10^-3 mm^2/s	ALWAYS	AUTO	no units, no units, cm/s, milliradian, ms, mm^2/s, s,%,/s, S/m, kPa, millimol, parts per million, Hz, um^2/s, mm^2/s
>Frame VOI LUT Sequence	0028,9132	SQ		ALWAYS	AUTO	-
>>Window Center	0028,1050	DS		ALWAYS	AUTO	-
>>Window Width	0028,1051	DS		ALWAYS	AUTO	-
>Frame Anatomy Sequence	0020,9071	SQ		ALWAYS	AUTO	-
>>Frame Laterality	0020,9072	CS		ALWAYS	AUTO	value from examcard.
>>Anatomic Region Sequence	0008,2218	SQ		ALWAYS	AUTO	-
>>>Anatomic Region Modifier Sequence	0008,2220	SQ		ALWAYS	AUTO	-
>>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	Value from examcard from STANDARD table, possibly translated
>Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	
>>Purpose of Reference Code Sequence	0040,A170	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>>Referenced Frame Number	0008,1160	IS		ANAP	AUTO	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Real World Value Mapping Sequence	0040,9096	SQ		ANAP	AUTO	-
>>LUT Explanation	0028,3003	LO		ALWAYS	AUTO	-
>>Measurement Units Code Sequence	0040,08EA	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>>LUT Label	0040,9210	SH		ALWAYS	AUTO	-
>>Real World Value Last Value Mapped	0040,9211	US /SS		ALWAYS	AUTO	-
>>Real World Value First Value Mapped	0040,9216	US /SS		ALWAYS	AUTO	-
>>Real World Value Intercept	0040,9224	FD		ANAP	AUTO	-

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>>Real World Value Slope	0040,9225	FD		ANAP	AUTO	-
>Respiratory Synchronization Sequence	0020,9253	SQ		ANAP	AUTO	-
>>Respiratory Interval Time	0020,9254	FD		ALWAYS	AUTO	-
>>Nominal Respiratory Trigger Delay Time	0020,9255	FD		ALWAYS	AUTO	-
>MR Image Frame Type Sequence	0018,9226	SQ		ALWAYS	AUTO	-
>>Frame Type	0008,9007	CS		ALWAYS	AUTO	-
>>Pixel Presentation	0008,9205	CS		ALWAYS	AUTO	-
>>Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
>>Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	Applied values: MAX_IP, MPR, NONE
>>Complex Image Component	0008,9208	CS		ALWAYS	AUTO	-
>>Acquisition Contrast	0008,9209	CS		ALWAYS	CONFIG	-
>MR Timing and Related Parameters Sequence	0018,9112	SQ		ALWAYS	AUTO	-
>>Repetition Time	0018,0080	DS		ANAP	AUTO	-
>>Echo Train Length	0018,0091	IS		ANAP	AUTO	-
>>Flip Angle	0018,1314	DS		ANAP	AUTO	-
>>Operating Mode Sequence	0018,9176	SQ		ANAP	AUTO	-
>>>Operating Mode Type	0018,9177	CS		ALWAYS	AUTO	-
>>>Operating Mode	0018,9178	CS		ALWAYS	AUTO	-
>>Gradient Output Type	0018,9180	CS		ANAP	AUTO	-
>>Gradient Output	0018,9182	FD		ANAP	AUTO	-
>>Specific Absorption Rate Sequence	0018,9239	SQ		ANAP	AUTO	-
>>>Specific Absorption Rate Definition	0018,9179	CS		ALWAYS	AUTO	-
>>>Specific Absorption Rate Value	0018,9181	FD		ALWAYS	AUTO	-
>>RF Echo Train Length	0018,9240	US		ANAP	AUTO	-
>>Gradient Echo Train Length	0018,9241	US		ANAP	AUTO	
>MR Echo Sequence	0018,9114	SQ		ALWAYS	AUTO	-
>>Effective Echo Time	0018,9082	FD		ANAP	AUTO	-
>MR Modifier Sequence	0018,9115	SQ		ALWAYS	AUTO	-
>>Inversion Recovery	0018,9009	CS		ANAP	AUTO	-
>>Flow Compensation	0018,9010	CS		ANAP	AUTO	-
>>Spoiling	0018,9016	CS		ANAP	AUTO	-
>>T2 Preparation	0018,9021	CS		ANAP	AUTO	-
>>Spectrally Selected Excitation	0018,9026	CS		ANAP	AUTO	-
>>Spatial Pre-saturation	0018,9027	CS		ANAP	AUTO	-
>>Partial Fourier Direction	0018,9036	CS		ANAP	AUTO	-
>>Parallel Reduction Factor In-plane	0018,9069	FD		ANAP	AUTO	-
>>Parallel Acquisition	0018,9077	CS		ANAP	AUTO	-
>>Parallel Acquisition Technique	0018,9078	CS		ANAP	AUTO	-
>>Inversion Times	0018,9079	FD		ANAP	AUTO	-
>>Partial Fourier	0018,9081	CS		ANAP	AUTO	-
>>Parallel Reduction Factor out-of-plane	0018,9155	FD		ANAP	AUTO	-
>>Parallel Reduction Factor Second In-plane	0018,9168	FD		ANAP	AUTO	-
>>Flow Compensation Direction	0018,9183	CS		ANAP	AUTO	-
>MR FOV/Geometry Sequence	0018,9125	SQ		ALWAYS	AUTO	-
>>Percent Sampling	0018,0093	DS		ANAP	AUTO	-
>>Percent Phase Field of View	0018,0094	DS		ANAP	AUTO	-

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>>In-plane Phase Encoding Direction	0018,1312	CS		ANAP	AUTO	-
>>MR Acquisition Frequency Encoding Steps	0018,9058	US		ANAP	AUTO	-
>>MR Acquisition Phase Encoding Steps in-plane	0018,9231	US		ANAP	AUTO	-
>>MR Acquisition Phase Encoding Steps out-of-plane	0018,9232	US		ANAP	AUTO	-
>MR Imaging Modifier Sequence	0018,9006	SQ		ALWAYS	AUTO	-
>>Pixel Bandwidth	0018,0095	DS		ANAP	AUTO	-
>>Tag Angle First Axis	0018,9019	FD		ANAP	AUTO	-
>>Magnetization Transfer	0018,9020	CS		ANAP	AUTO	-
>>Blood Signal Nulling	0018,9022	CS		ANAP	AUTO	-
>>Tagging	0018,9028	CS		ANAP	AUTO	-
>>Tag Spacing First Dimension	0018,9030	FD		ANAP	AUTO	-
>>Tag Thickness	0018,9035	FD		ANAP	AUTO	-
>>Transmitter Frequency	0018,9098	FD		ANAP	AUTO	-
>>Tag Spacing Second Dimension	0018,9218	FD		ANAP	AUTO	-
>>Tag Angle Second Axis	0018,9219	SS		ANAP	AUTO	-
>MR Receive Coil Sequence	0018,9042	SQ		ALWAYS	AUTO	-
>>Receive Coil Name	0018,1250	SH		EMPTY	AUTO	-
>>Receive Coil Manufacturer Name	0018,9041	LO		ANAP	AUTO	-
>>Receive Coil Type	0018,9043	CS		ANAP	AUTO	-
>>Quadrature Receive Coil	0018,9044	CS		ANAP	AUTO	-
>>Multi-Coil Definition Sequence	0018,9045	SQ		ANAP	AUTO	-
>>>Multi-Coil Element Name	0018,9047	SH		ALWAYS	AUTO	-
>>>Multi-Coil Element Used	0018,9048	CS		ALWAYS	AUTO	-
>MR Transmit Coil Sequence	0018,9049	SQ		ALWAYS	AUTO	-
>>Transmit Coil Name	0018,1251	SH		ALWAYS	AUTO	-
>>Transmit Coil Manufacturer Name	0018,9050	LO		EMPTY	FIXED	-
>>Transmit Coil Type	0018,9051	CS		ANAP	AUTO	-
>MR Diffusion Sequence	0018,9117	SQ		ANAP	AUTO	-
>>Diffusion Directionality	0018,9075	CS		ANAP	AUTO	-
>>Diffusion Gradient Direction Sequence	0018,9076	SQ		ANAP	AUTO	-
>>>Diffusion Gradient Orientation	0018,9089	FD		ANAP	AUTO	-
>>Diffusion b-value	0018,9087	FD		ANAP	AUTO	-
>>Diffusion Anisotropy Type	0018,9147	CS		ANAP	AUTO	-
>MR Averages Sequence	0018,9119	SQ		ALWAYS	AUTO	-
>>Number of Averages	0018,0083	DS		ANAP	AUTO	-
>MR Spatial Saturation Sequence	0018,9107	SQ		ANAP	AUTO	if slab information is present
>>Slab Thickness	0018,9104	FD		ALWAYS	AUTO	-
>>Slab Orientation	0018,9105	FD		ALWAYS	AUTO	-
>>Mid Slab Position	0018,9106	FD		ALWAYS	AUTO	-
>MR Metabolite Map Sequence	0018,9152	SQ		ANAP	AUTO	-
>>Metabolite Map Description	0018,9080	ST		ANAP	AUTO	-
>MR Velocity Encoding Sequence	0018,9197	SQ		ANAP	AUTO	-
>>Velocity Encoding Direction	0018,9090	FD		ANAP	AUTO	-
>>Velocity Encoding Minimum Value	0018,9091	FD		ANAP	AUTO	Applied value: 0.0
>>Velocity Encoding Maximum Value	0018,9217	FD		ANAP	AUTO	-
Per-frame Functional Groups Sequence	5200,9230	SQ		ALWAYS		-

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>Pixel Measures Sequence	0028,9110	SQ		ALWAYS	AUTO	-
>>Slice Thickness	0018,0050	DS		ANAP	AUTO	-
>>Pixel Spacing	0028,0030	DS		ANAP	AUTO	-
>Frame Content Sequence	0020,9111	SQ		ALWAYS	AUTO	-
>>Frame Acquisition Datetime	0018,9074	DT		ANAP	AUTO	-
>>Frame Reference Datetime	0018,9151	DT		ANAP	AUTO	-
>>Frame Acquisition Duration	0018,9220	FD		ANAP	AUTO	-
>>Stack ID	0020,9056	SH		ANAP	AUTO	
>>In-Stack Position Number	0020,9057	UL		ANAP	AUTO	-
>>Dimension Index Values	0020,9157	UL		ANAP	AUTO	-
>Plane Position Sequence	0020,9113	SQ		ALWAYS	AUTO	-
>>Image Position (Patient)	0020,0032	DS		ANAP	AUTO	-
>Plane Orientation Sequence	0020,9116	SQ		ALWAYS	AUTO	-
>>Image Orientation (Patient)	0020,0037	DS		ANAP	AUTO	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	if scan was planned on other scan
>>Purpose of Reference Code Sequence	0040,A170	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>>Referenced Frame Number	0008,1160	IS		ANAP	AUTO	-
>Cardiac Synchronization Sequence	0018,9118	SQ		ANAP	AUTO	-
>>Nominal Cardiac Trigger Delay Time	0020,9153	FD		ALWAYS	AUTO	-
>>R - R Interval Time Nominal	0020,9251	FD		ANAP	AUTO	-
>Pixel Value Transformation Sequence	0028,9145	SQ		ALWAYS	AUTO	-
>>Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	-
>>Rescale Slope	0028,1053	DS		ALWAYS	AUTO	-
>>Rescale Type	0028,1054	LO	Normalized, US, cm/s, mrad, ms, mm^2/s, s,%,/s, S/m, kPa, mmol, ppm, Hz, um^2/sec, 10^-3 mm^2/s	ALWAYS	AUTO	no units, no units, cm/s, milliradian, ms, mm^2/s, s,%,/s, S/m, kPa, millimol, parts per million, Hz, um^2/s, mm^2/s
>Frame VOI LUT Sequence	0028,9132	SQ		ALWAYS	AUTO	-
>>Window Center	0028,1050	DS		ALWAYS	AUTO	-
>>Window Width	0028,1051	DS		ALWAYS	AUTO	-
>Real World Value Mapping Sequence	0040,9096	SQ		ANAP	AUTO	-
>>LUT Explanation	0028,3003	LO		ALWAYS	AUTO	-
>>Measurement Units Code Sequence	0040,08EA	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>>LUT Label	0040,9210	SH		ALWAYS	AUTO	-
>>Real World Value Last Value Mapped	0040,9211	US /SS		ALWAYS	AUTO	-
>>Real World Value First Value Mapped	0040,9216	US /SS		ALWAYS	AUTO	-
>>Real World Value Intercept	0040,9224	FD		ALWAYS	AUTO	-
>>Real World Value Slope	0040,9225	FD		ALWAYS	AUTO	-
>Respiratory Synchronization Sequence	0020,9253	SQ		ANAP	AUTO	-

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>>Respiratory Interval Time	0020,9254	FD		ALWAYS	AUTO	-
>>Nominal Respiratory Trigger Delay Time	0020,9255	FD		ALWAYS	AUTO	-
>MR Image Frame Type Sequence	0018,9226	SQ		ALWAYS	AUTO	-
>>Frame Type	0008,9007	CS		ALWAYS	AUTO	-
>>Pixel Presentation	0008,9205	CS		ALWAYS	AUTO	-
>>Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
>>Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	Applied values: MAX_IP, MPR, NONE
>>Complex Image Component	0008,9208	CS		ALWAYS	AUTO	-
>>Acquisition Contrast	0008,9209	CS		ALWAYS	AUTO	-
>MR Timing and Related Parameters Sequence	0018,9112	SQ		ALWAYS	AUTO	-
>>Repetition Time	0018,0080	DS		ANAP	AUTO	-
>>Echo Train Length	0018,0091	IS		ANAP	AUTO	-
>>Flip Angle	0018,1314	DS		ANAP	AUTO	-
>>Operating Mode Sequence	0018,9176	SQ		ANAP	AUTO	-
>>>Operating Mode Type	0018,9177	CS		ALWAYS	AUTO	-
>>>Operating Mode	0018,9178	CS		ALWAYS	AUTO	-
>>Gradient Output Type	0018,9180	CS		ANAP	AUTO	-
>>Gradient Output	0018,9182	FD		ANAP	AUTO	-
>>Specific Absorption Rate Sequence	0018,9239	SQ		ANAP	AUTO	-
>>>Specific Absorption Rate Definition	0018,9179	CS		ALWAYS	AUTO	-
>>>Specific Absorption Rate Value	0018,9181	FD		ALWAYS	AUTO	-
>>RF Echo Train Length	0018,9240	US		ANAP	AUTO	-
>>Gradient Echo Train Length	0018,9241	US		ANAP	AUTO	-
>MR FOV/Geometry Sequence	0018,9125	SQ		ALWAYS	AUTO	-
>>Percent Sampling	0018,0093	DS		ANAP	AUTO	-
>>Percent Phase Field of View	0018,0094	DS		ANAP	AUTO	-
>>In-plane Phase Encoding Direction	0018,1312	CS		ANAP	AUTO	-
>>MR Acquisition Frequency Encoding Steps	0018,9058	US		ANAP	AUTO	-
>>MR Acquisition Phase Encoding Steps in-plane	0018,9231	US		ANAP	AUTO	-
>>MR Acquisition Phase Encoding Steps out-of-plane	0018,9232	US		ANAP	AUTO	-
>MR Echo Sequence	0018,9114	SQ		ALWAYS	AUTO	-
>>Effective Echo Time	0018,9082	FD		ANAP	AUTO	-
>MR Modifier Sequence	0018,9115	SQ		ALWAYS	AUTO	-
>>Inversion Recovery	0018,9009	CS		ANAP	AUTO	-
>>Flow Compensation	0018,9010	CS		ANAP	AUTO	-
>>Spoiling	0018,9016	CS		ANAP	AUTO	-
>>T2 Preparation	0018,9021	CS		ANAP	AUTO	-
>>Spectrally Selected Excitation	0018,9026	CS		ANAP	AUTO	-
>>Spatial Pre-saturation	0018,9027	CS		ANAP	AUTO	-
>>Partial Fourier Direction	0018,9036	CS		ANAP	AUTO	-
>>Parallel Reduction Factor In-plane	0018,9069	FD		ANAP	AUTO	-
>>Parallel Acquisition	0018,9077	CS		ANAP	AUTO	-
>>Parallel Acquisition Technique	0018,9078	CS		ANAP	AUTO	-
>>Inversion Times	0018,9079	FD		ANAP	AUTO	-
>>Partial Fourier	0018,9081	CS		ANAP	AUTO	-

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>>Parallel Reduction Factor out-of-plane	0018,9155	FD		ANAP	AUTO	-
>>Parallel Reduction Factor Second In-plane	0018,9168	FD		ANAP	AUTO	-
>>Flow Compensation Direction	0018,9183	CS		ANAP	AUTO	-
>MR Imaging Modifier Sequence	0018,9006	SQ		ANAP	AUTO	-
>>Pixel Bandwidth	0018,0095	DS		ANAP	AUTO	-
>>Tag Angle First Axis	0018,9019	FD		ANAP	AUTO	-
>>Magnetization Transfer	0018,9020	CS		ANAP	AUTO	-
>>Blood Signal Nulling	0018,9022	CS		ANAP	AUTO	-
>>Tagging	0018,9028	CS		ANAP	AUTO	-
>>Tag Spacing First Dimension	0018,9030	FD		ANAP	AUTO	-
>>Tag Thickness	0018,9035	FD		ANAP	AUTO	Applied value: 0.0
>>Transmitter Frequency	0018,9098	FD		ANAP	AUTO	-
>>Tag Spacing Second Dimension	0018,9218	FD		ANAP	AUTO	-
>>Tag Angle Second Axis	0018,9219	SS		ANAP	AUTO	-
>MR Receive Coil Sequence	0018,9042	SQ		ALWAYS	AUTO	-
>>Receive Coil Name	0018,1250	SH		ANAP	AUTO	-
>>Receive Coil Manufacturer Name	0018,9041	LO		EMPTY	FIXED	-
>>Receive Coil Type	0018,9043	CS		ANAP	AUTO	-
>>Quadrature Receive Coil	0018,9044	CS		ANAP	AUTO	-
>>Multi-Coil Definition Sequence	0018,9045	SQ		ANAP	AUTO	-
>>>Multi-Coil Element Name	0018,9047	SH		ALWAYS	AUTO	-
>>>Multi-Coil Element Used	0018,9048	CS		ALWAYS	AUTO	-
>MR Transmit Coil Sequence	0018,9049	SQ		ALWAYS	AUTO	-
>>Transmit Coil Name	0018,1251	SH		ALWAYS	AUTO	-
>>Transmit Coil Manufacturer Name	0018,9050	LO		EMPTY	FIXED	-
>>Transmit Coil Type	0018,9051	CS		ANAP	AUTO	-
>MR Diffusion Sequence	0018,9117	SQ		ANAP	AUTO	-
>>Diffusion Directionality	0018,9075	CS		ANAP	AUTO	-
>>Diffusion Gradient Direction Sequence	0018,9076	SQ		ANAP	AUTO	-
>>>Diffusion Gradient Orientation	0018,9089	FD		ANAP	AUTO	-
>>Diffusion b-value	0018,9087	FD		ANAP	AUTO	-
>>Diffusion Anisotropy Type	0018,9147	CS		ANAP	AUTO	Applied value: FRACTIONAL
>MR Averages Sequence	0018,9119	SQ		ALWAYS	AUTO	-
>>Number of Averages	0018,0083	DS		ANAP	AUTO	-
>MR Spatial Saturation Sequence	0018,9107	SQ		ANAP	AUTO	if slab information is present
>>Slab Thickness	0018,9104	FD		ALWAYS	AUTO	-
>>Slab Orientation	0018,9105	FD		ALWAYS	AUTO	-
>>Mid Slab Position	0018,9106	FD		ALWAYS	AUTO	-
>MR Metabolite Map Sequence	0018,9152	SQ		ANAP	AUTO	-
>>Metabolite Map Description	0018,9080	ST		ANAP	AUTO	-
>MR Velocity Encoding Sequence	0018,9197	SQ		ANAP	AUTO	-
>>Velocity Encoding Direction	0018,9090	FD		ANAP	AUTO	-
>>Velocity Encoding Minimum Value	0018,9091	FD		ANAP	AUTO	Applied value: 0.0
>>Velocity Encoding Maximum Value	0018,9217	FD		ANAP	AUTO	-
>Frame Anatomy Sequence	0020,9071	SQ		ALWAYS	AUTO	-
>>Frame Laterality	0020,9072	CS		ALWAYS	AUTO	Value from examcard
>>Anatomic Region Sequence	0008,2218	SQ		ALWAYS	AUTO	-

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>>>Anatomic Region Modifier Sequence	0008,2220	SQ		ALWAYS	AUTO	-
>>>>Code Value	0008,0100	SH		ALWAYS	COPY	-
>>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>>>>Code Meaning	0008,0104	LO		ALWAYS	COPY	Value from examcard from STANDARD table, possibly translated

Table 124: Multi-frame Dimension Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Dimension Organization Sequence	0020,9221	SQ		VNAP	AUTO	-
>Dimension Organization UID	0020,9164	UI		ALWAYS	AUTO	-
Dimension Index Sequence	0020,9222	SQ		VNAP	AUTO	-
>Dimension Organization UID	0020,9164	UI		ALWAYS	AUTO	-
>Dimension Index Pointer	0020,9165	AT		ALWAYS	AUTO	-
>Functional Group Pointer	0020,9167	AT		ANAP	AUTO	-
>Dimension Index Private Creator	0020,9213	LO		ANAP	AUTO	-
>Functional Group Private Creator	0020,9238	LO		ANAP	AUTO	-
>Dimension Description Label	0020,9421	LO		ANAP	AUTO	Free text description that explains the meaning of the dimension.

Table 125: Cardiac Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Low R-R Value	0018,1081	IS		ANAP	AUTO	-
High R-R Value	0018,1082	IS		ANAP	AUTO	-
Intervals Acquired	0018,1083	IS		ANAP	AUTO	-
Intervals Rejected	0018,1084	IS		ANAP	AUTO	-
Cardiac Synchronization Technique	0018,9037	CS		ANAP	AUTO	-
Cardiac R-R Interval Specified	0018,9070	FD		ANAP	AUTO	-
Cardiac Signal Source	0018,9085	CS		ANAP	AUTO	-
Cardiac Beat Rejection Technique	0018,9169	CS		ANAP	AUTO	-

Table 126: Respiratory Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Respiratory Motion Compensation Technique	0018,9170	CS		ANAP	AUTO	-
Respiratory Signal Source	0018,9171	CS		ANAP	AUTO	-
Respiratory Trigger Delay Threshold	0020,9256	FD		ANAP	AUTO	-

Table 127: Bulk Motion Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Bulk Motion Compensation Technique	0018,9172	CS		ANAP	AUTO	Applied value: NONE

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Table 128: Enhanced MR Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ALWAYS	AUTO	Applied values: ({ORIGINAL, DERIVED}, PRIMARY, {METABOLITE_MAP, REALTIME, VELOCITY, KTRANS, KEP, M_FFE, B0, B0_MAP, VE, VP,APTW_SE},{ADC, B0, DELAYED_IMAGE, DELAYED_RECON, DIFFUSION, DIFFUSION_ANISO, ENHANCEMENT, FLOW_ENCODED, FLUID_ATTENUATED, FOV_FUSION, INVERSE_RECON, M, MAXIMUM, MIXED, MTT, NONE, PERFUSION, PROTON_DENSITY, RCBF, RCBV, RESAMPLED, SPECTRO, STIR, SUBTRACTION, T1, T2, T2_STAR, TAGGING, TOF, TTP, UNKNOWN, R2, R2_STAR, W, F, IP, OP, KTRANS, KEP, VE, VP,STIFF,WAVE,APTW}, {FFE,MRE,NONE, UNSPECIFIED,SE})
Spacing Between Slices	0018,0088	DS		ANAP	AUTO	-
Samples per Pixel	0028,0002	US		ALWAYS	FIXED	-
Photometric Interpretation	0028,0004	CS		ALWAYS	FIXED	-
Bits Allocated	0028,0100	US		ALWAYS	IMPLICIT	-
Bits Stored	0028,0101	US		ALWAYS	IMPLICIT	-
High Bit	0028,0102	US		ALWAYS	AUTO	-
Burned In Annotation	0028,0301	CS	NO	ALWAYS	AUTO	Applied value: NO
Lossy Image Compression	0028,2110	CS	00	ALWAYS	AUTO	Applied value: 00
Presentation LUT Shape	2050,0020	CS		ALWAYS	AUTO	-
Acquisition Datetime	0008,002A	DT		ANAP	AUTO	-
Source Image Evidence Sequence	0008,9154	SQ		ANAP	AUTO	-
>Referenced Series Sequence	0008,1115	SQ		ANAP	AUTO	-
>>Referenced SOP Sequence	0008,1199	SQ		ANAP	AUTO	-
>>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
>Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Magnetic Field Strength	0018,0087	DS		ANAP	AUTO	-
Content Qualification	0018,9004	CS		ALWAYS	AUTO	-
k-space Filtering	0018,9064	CS		ANAP	AUTO	Applied values: COSINE, COSINE_SQUARED, FERMI, GAUSSIAN, HAMMING, HANNING, LORENTZIAN, LRNTZ_GSS_TRNSFM, NONE, RIESZ, TUKEY, USER_DEFINED
Acquisition Duration	0018,9073	FD		ANAP	AUTO	-
Resonant Nucleus	0018,9100	CS		ANAP	AUTO	Applied values: 129XE, 13C, 19F, 1H, 23NA, 31P, 3HE, 7LI, OTHER
Applicable Safety Standard Agency	0018,9174	CS		ANAP	AUTO	-

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Applicable Safety Standard Description	0018,9175	LO		ANAP	AUTO	-
Acquisition Number	0020,0012	IS		ANAP	AUTO	-
Image Comments	0020,4000	LT		ANAP	USER	-
Pixel Presentation	0008,9205	CS		ALWAYS	AUTO	-
Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	Applied values: MAX_IP, MPR, NONE
Complex Image Component	0008,9208	CS		ALWAYS	AUTO	-
Acquisition Contrast	0008,9209	CS		ALWAYS	AUTO	-

Table 129: MR Pulse Sequence Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
MR Acquisition Type	0018,0023	CS	1D, 2D, 3D, UNKNOWN	ANAP	AUTO	Applied values: 1D, 2D, 3D, UNKNOWN
Pulse Sequence Name	0018,9005	SH		ANAP	AUTO	-
Echo Pulse Sequence	0018,9008	CS		ANAP	AUTO	-
Multiple Spin Echo	0018,9011	CS		ANAP	AUTO	-
Multi-planar Excitation	0018,9012	CS		ANAP	AUTO	-
Phase Contrast	0018,9014	CS		ANAP	AUTO	-
Time of Flight Contrast	0018,9015	CS		ANAP	AUTO	-
Steady State Pulse Sequence	0018,9017	CS		ANAP	AUTO	-
Echo Planar Pulse Sequence	0018,9018	CS		ANAP	AUTO	-
Saturation Recovery	0018,9024	CS		ANAP	AUTO	-
Spectrally Selected Suppression	0018,9025	CS		ANAP	AUTO	-
Oversampling Phase	0018,9029	CS		ANAP	AUTO	-
Geometry of k-Space Traversal	0018,9032	CS		ANAP	AUTO	-
Segmented k-Space Traversal	0018,9033	CS		ANAP	AUTO	-
Rectilinear Phase Encode Reordering	0018,9034	CS	CENTRIC, LINEAR, REVERSE_CENTRIC, REVERSE_LINEAR, SEGMENTED, UNKNOWN	ANAP	AUTO	Applied values: CENTRIC, LINEAR, REVERSE_CENTRIC, REVERSE_LINEAR, SEGMENTED, UNKNOWN
Number of k-Space Trajectories	0018,9093	US		ANAP	AUTO	-
Coverage of k-Space	0018,9094	CS		ANAP	AUTO	-

Table 130: Supplemental Palette Color Table Lookup Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Red Palette Color Lookup Table Descriptor	0028,1101	US /SS		ALWAYS	AUTO	-
Green Palette Color Lookup Table Descriptor	0028,1102	US /SS		ALWAYS	AUTO	-
Blue Palette Color Lookup Table Descriptor	0028,1103	US /SS		ALWAYS	AUTO	-
Red Palette Color Lookup Table Data	0028,1201	O W		ALWAYS	AUTO	-
Green Palette Color Lookup Table Data	0028,1202	O W		ALWAYS	AUTO	-
Blue Palette Color Lookup Table Data	0028,1203	O W		ALWAYS	AUTO	-

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Table 131: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ALWAYS	AUTO	Default: ISO_IR 6.
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	-
Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

8.1.1.4. MR Image Storage SOP Class

Table 132: IOD of Created MR Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Plane Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	MR Image Module	ALWAYS
Image	Overlay Plane Module	CONDITIONAL
Image	VOI LUT Module	CONDITIONAL
Image	SOP Common Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 133: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	-
Patient ID	0010,0020	LO		ALWAYS	MWL, USER	-
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	-
Patient's Sex	0010,0040	CS		ALWAYS	MWL, USER	-
Other Patient IDs	0010,1000	LO		VNAP	MWL, USER	Only present when supplied by the RIS.
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	Only present when supplied by the RIS.
Patient Comments	0010,4000	LT		ANAP	MWL	Only present when supplied by the RIS.

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Table 134: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO, MWL	-
Study Time	0008,0030	TM		ALWAYS	MWL	-
Accession Number	0008,0050	SH		ALWAYS	AUTO, MWL, USER	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	-
Study Description	0008,1030	LO		VNAP	MWL, USER	-
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL, USER	-
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	AUTO	-
>Context Group Version	0008,0106	DT		ANAP	AUTO	-
>Context Group Local Version	0008,0107	DT		ANAP	AUTO	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	AUTO	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	AUTO	-
Physician(s) of Record	0008,1048	PN		ANAP	AUTO	-
Name of Physician(s) Reading Study	0008,1060	PN		ANAP	AUTO	-
Referenced Study Sequence	0008,1110	SQ		ALWAYS	AUTO, MWL	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO, MWL	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO, MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL	-
Study ID	0020,0010	SH		ALWAYS	AUTO	-

Table 135: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		VNAP	MWL	-
Patient's Age	0010,1010	AS		ANAP	COPY	-
Patient's Size	0010,1020	DS		VNAP	MWL	-
Patient's Weight	0010,1030	DS		ALWAYS	MWL, USER	-
Occupation	0010,2180	SH		ANAP	MWL	Only present when patient demographics received from RIS.
Additional Patient History	0010,21B0	LT		VNAP	MWL	

Table 136: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Modality	0008,0060	CS		ALWAYS	FIXED	Applied value: MR
Series Description	0008,103E	LO		ANAP	AUTO, USER	-
Performing Physician's Name	0008,1050	PN		ANAP	AUTO	-
Operators' Name	0008,1070	PN		EMPTY	FIXED	-
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	AUTO	-
Body Part Examined	0018,0015	CS		ANAP	AUTO	If ExamCard scan.

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Protocol Name	0018,1030	LO		ALWAYS	USER	Scan name
Patient Position	0018,5100	CS		ALWAYS	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Generated by MR System.
Series Number	0020,0011	IS		ALWAYS	AUTO	Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number.
Laterality	0020,0060	CS		ANAP	USER	-
Request Attributes Sequence	0040,0275	SQ		VNAP	MWL	-
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	-
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL, USER	-
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	MWL	-
>Requested Procedure ID	0040,1001	SH		ALWAYS	MWL	-
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	-
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	-
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	-
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	AUTO	-
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>Context Identifier	0008,010F	CS		VNAP	MWL	-
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL, USER	maximum of 64 characters, Comments added on MR.

Table 137: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	-
Position Reference Indicator	0020,1040	LO		EMPTY	FIXED	-

Table 138: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	FIXED	Applied value: Philips Medical Systems
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Configured on the system.
Station Name	0008,1010	SH		ANAP	AUTO	-
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-
Manufacturer's Model Name	0008,1090	LO		ANAP	AUTO	
Device Serial Number	0018,1000	LO		ALWAYS	FIXED	System serial number.
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	The release text of the original image.

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Table 139: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Date	0008,0022	DA		ALWAYS	AUTO, COPY	Same as Content Date.
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Acquisition Datetime	0008,002A	DT		ANAP	AUTO	-
Acquisition Time	0008,0032	TM		ALWAYS	AUTO, COPY	Same as Content Time.
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Referenced Image Sequence	0008,1140	SQ		VNAP	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	IMPLICIT	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	IMPLICIT	-
Acquisition Number	0020,0012	IS		ALWAYS	AUTO	Scan Number on UI.
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS		ANAP	AUTO	-
Lossy Image Compression	0028,2110	CS		ANAP	FIXED	Applied value: 00
Presentation LUT Shape	2050,0020	CS		ANAP	FIXED	Applied value: IDENTITY
Real World Value Mapping Sequence	0040,9096	SQ		ANAP	AUTO	
>LUT Explanation	0028,3003	LO		ANAP	AUTO	Real World Value Mapping for 10^{-3} mm²/s
>>Code value	0008,0100	SH		ANAP	AUTO	mm2/s
>>Coding Scheme Designator	0008,0102	SH		ANAP	AUTO	UCUM
>>Code Meaning	0008,0104	LO		ANAP	AUTO	mm^2/s
>>Context UID	0008,0117	UI		ANAP	AUTO	1.2.840.10008.6.1.918
>LUT Label	0040,9210	SH		ANAP	AUTO	Philips
>>Real World Value Last Value Mapped	0040,9211	US		ANAP	AUTO	0FFFH / 4095
>>Real World Value First Value Mapped	0040,9216	US		ANAP	AUTO	0000H / 0
>>Real World Value Intercept	0040,9224	FD		ANAP	AUTO	0
>>Real World Value Slope	0040,9225	FD		ANAP	AUTO	0.00171741354279

Table 140: Image Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Slice Thickness	0018,0050	DS		ALWAYS	AUTO	-
Image Position (Patient)	0020,0032	DS		ALWAYS	AUTO	-
Image Orientation (Patient)	0020,0037	DS		ALWAYS	AUTO	-
Slice Location	0020,1041	DS		ALWAYS	AUTO	Value is the distance for the plane to a fixed point. Taking direction into account.
Pixel Spacing	0028,0030	DS		ALWAYS	AUTO	-

Table 141: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Planar Configuration	0028,0006	US		ANAP	AUTO	-
Rows	0028,0010	US		ALWAYS	IMPLICIT	Applied values: min: 64 - max: 2048
Columns	0028,0011	US		ALWAYS	IMPLICIT	Applied values: min: 64 - max: 2048
Pixel Aspect Ratio	0028,0034	IS		ANAP	FIXED	Applied value: (1\1)
Bits Stored	0028,0101	US		ALWAYS	IMPLICIT	-
High Bit	0028,0102	US		ALWAYS	IMPLICIT	-

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Pixel Representation	0028,0103	US		ALWAYS	IMPLICIT	Applied value: 0
Pixel Data	7FE0,0010	O W/ OB		ALWAYS	IMPLICIT	-

Table 142: MR Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ALWAYS	AUTO	Applied values: ({ORIGINAL, DERIVED}, PRIMARY, {METABOLITE_MAP, REALTIME, VELOCITY, KTRANS, KEP, M_FFE, B0, B0_MAP, VE, VP_APTW_SE},{ADC, B0, DELAYED_IMAGE, DELAYED_RECON, DIFFUSION, DIFFUSION_ANISO, ENHANCEMENT, FLOW_ENCODED, FLUID_ATTENUATED, FOV_FUSION, INVERSE_RECON, M, MAXIMUM, MIXED, MTT, NONE, PERFUSION, PROTON_DENSITY, RCBF, RCBV, RESAMPLED, SPECTRO, STIR, SUBTRACTION, T1, T2, T2_STAR, TAGGING, TOF, TTP, UNKNOWN, R2, R2_STAR, W, F, IP, OP, KTRANS, KEP, VE, VP,STIFF,WAVE,APTW}, {FFE,MRE,NONE, UNSPECIFIED,SE})
Scanning Sequence	0018,0020	CS		ALWAYS	AUTO	-
Sequence Variant	0018,0021	CS		ALWAYS	AUTO	-
Scan Options	0018,0022	CS		VNAP	IMPLICIT	-
MR Acquisition Type	0018,0023	CS		ALWAYS	AUTO	-
Sequence Name	0018,0024	SH		ANAP	AUTO	-
Angio Flag	0018,0025	CS		ANAP	AUTO	-
Repetition Time	0018,0080	DS		ANAP	IMPLICIT, USER	-
Echo Time	0018,0081	DS		ALWAYS	IMPLICIT, USER	-
Inversion Time	0018,0082	DS		ANAP	IMPLICIT, USER	-
Number of Averages	0018,0083	DS		ALWAYS	IMPLICIT, USER	-
Imaging Frequency	0018,0084	DS		ALWAYS	IMPLICIT	-
Imaged Nucleus	0018,0085	SH		ALWAYS	IMPLICIT	-
Echo Number(s)	0018,0086	IS		VNAP	IMPLICIT	-
Magnetic Field Strength	0018,0087	DS		VNAP	CONFIG	-
Spacing Between Slices	0018,0088	DS		ALWAYS	IMPLICIT, USER	-
Number of Phase Encoding Steps	0018,0089	IS		VNAP	IMPLICIT, USER	-
Echo Train Length	0018,0091	IS		VNAP	IMPLICIT, USER	-
Percent Sampling	0018,0093	DS		VNAP	IMPLICIT, USER	-
Percent Phase Field of View	0018,0094	DS		VNAP	IMPLICIT, USER	-
Pixel Bandwidth	0018,0095	DS		ALWAYS	AUTO	-
Trigger Time	0018,1060	DS		VNAP	USER	Will only have a value if Dynamic Series (2001,1012) Equals 1
Nominal Interval	0018,1062	IS		ANAP	AUTO	-
Beat Rejection Flag	0018,1080	CS		ANAP	AUTO	-

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Low R-R Value	0018,1081	IS		ANAP	IMPLICIT	-
High R-R Value	0018,1082	IS		ANAP	IMPLICIT	-
Intervals Acquired	0018,1083	IS		ANAP	IMPLICIT	-
Intervals Rejected	0018,1084	IS		ANAP	IMPLICIT	-
PVC Rejection	0018,1085	LO		ANAP	AUTO	-
Skip Beats	0018,1086	IS		ANAP	AUTO	-
Heart Rate	0018,1088	IS		ANAP	IMPLICIT, USER	-
Cardiac Number of Images	0018,1090	IS		ANAP	AUTO	-
Trigger Window	0018,1094	IS		ANAP	IMPLICIT	-
Reconstruction Diameter	0018,1100	DS		VNAP	CONFIG	Value is a copy of the largest value of the Field of View
Receive Coil Name	0018,1250	SH		ALWAYS	IMPLICIT, USER	-
Transmit Coil Name	0018,1251	SH		ANAP	IMPLICIT, USER	-
Acquisition Matrix	0018,1310	US		VNAP	IMPLICIT	-
In-plane Phase Encoding Direction	0018,1312	CS		VNAP	IMPLICIT	-
Flip Angle	0018,1314	DS		VNAP	IMPLICIT, USER	-
Variable Flip Angle Flag	0018,1315	CS		ANAP	AUTO	-
SAR	0018,1316	DS		VNAP	IMPLICIT, USER	-
dB/dt	0018,1318	DS		ANAP	AUTO	-
Temporal Position Identifier	0020,0100	IS		VNAP	IMPLICIT	-
Number of Temporal Positions	0020,0105	IS		VNAP	IMPLICIT, USER	-
Temporal Resolution	0020,0110	DS		ANAP	AUTO	-
Samples per Pixel	0028,0002	US		ALWAYS	FIXED	Applied value: 1
Photometric Interpretation	0028,0004	CS	MONOCHROME2	ALWAYS	FIXED	Applied value: MONOCHROME2
Bits Allocated	0028,0100	US		ALWAYS	FIXED	Applied value: 16

Table 143: Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Rows	6000,0010	US		ALWAYS	AUTO	-
Overlay Columns	6000,0011	US		ALWAYS	AUTO	-
Overlay Description	6000,0022	LO		ANAP	AUTO	-
Overlay Type	6000,0040	CS		ALWAYS	AUTO	-
Overlay Subtype	6000,0045	LO		ANAP	AUTO	-
Overlay Origin	6000,0050	SS		ALWAYS	AUTO	-
Overlay Bits Allocated	6000,0100	US		ALWAYS	AUTO	-
Overlay Bit Position	6000,0102	US		ALWAYS	AUTO	-
ROI Area	6000,1301	IS		ANAP	AUTO	-
ROI Mean	6000,1302	DS		ANAP	AUTO	-
ROI Standard Deviation	6000,1303	DS		ANAP	AUTO	-
Overlay Label	6000,1500	LO		EMPTY	FIXED	-
Overlay Data	6000,3000	OW/OB		ALWAYS	AUTO	-

Table 144: VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Window Center	0028,1050	DS		ALWAYS	AUTO	-
Window Width	0028,1051	DS		ALWAYS	AUTO	-

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Table 145: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ALWAYS	AUTO	Default: ISO_IR 100.
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	-
Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI		ALWAYS	FIXED	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

8.1.1.5. MR Spectroscopy Storage SOP Class

Table 146: IOD of Created MR Spectroscopy Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Series	MR Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Equipment	Enhanced General Equipment Module	ALWAYS
MR Spectroscopy	Acquisition Context Module	ALWAYS
MR Spectroscopy	Multi-frame Functional Groups Module (MR Spectroscopy)	ALWAYS
MR Spectroscopy	Multi-frame Dimension Module	ALWAYS
MR Spectroscopy	Cardiac Synchronization Module	CONDITIONAL
MR Spectroscopy	Respiratory Synchronization Module	CONDITIONAL
MR Spectroscopy	Bulk Motion Synchronization Module	CONDITIONAL
MR Spectroscopy	MR Spectroscopy Module	ALWAYS
MR Spectroscopy	MR Spectroscopy Pulse Sequence Module	CONDITIONAL
MR Spectroscopy	MR Spectroscopy Data Module	ALWAYS
MR Spectroscopy	SOP Common Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 147: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	-
Patient ID	0010,0020	LO		ALWAYS	COPY, MWL, USER	-
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	-
Patient's Sex	0010,0040	CS		ALWAYS	COPY, MWL, USER	-

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Other Patient IDs	0010,1000	LO		ANAP	MWL	Only present when patient demographics received from RIS.
Ethnic Group	0010,2160	SH		ANAP	COPY, MWL, USER	Only present when patient demographics received from RIS.
Patient Comments	0010,4000	LT		ANAP	MWL	Only present when patient demographics received from RIS.

Table 148: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO, MWL	-
Study Time	0008,0030	TM		ALWAYS	AUTO, MWL	-
Accession Number	0008,0050	SH		ALWAYS	AUTO, MWL, USER	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	-
Study Description	0008,1030	LO		VNAP	MWL, USER	-
Procedure Code Sequence	0008,1032	SQ		ALWAYS	AUTO, MWL, USER	-
>Code Value	0008,0100	SH		ALWAYS	AUTO, MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO, MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	AUTO, MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	AUTO, MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>Context Identifier	0008,010F	CS		ANAP	MWL	-
Referenced Study Sequence	0008,1110	SQ		ALWAYS	AUTO, MWL	As received from RIS or else default.
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO, MWL, USER	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO, MWL, USER	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL	-
Study ID	0020,0010	SH		ALWAYS	AUTO	-

Table 149: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		VNAP	MWL	-
Patient's Size	0010,1020	DS		VNAP	MWL	-
Patient's Weight	0010,1030	DS		ALWAYS	COPY, MWL, USER	-
Occupation	0010,2180	SH		ANAP	MWL	As received from RIS or else default (Empty).
Additional Patient History	0010,21B0	LT		VNAP	MWL	-

Table 150: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-

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Series Description	0008,103E	LO		ANAP	AUTO, USER	-
Operators' Name	0008,1070	PN		EMPTY	FIXED	-
Body Part Examined	0018,0015	CS		ANAP	AUTO	If examCard scan.
Protocol Name	0018,1030	LO		ALWAYS	USER	Scan name.
Patient Position	0018,5100	CS		ALWAYS	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Generated by MR system.
Series Number	0020,0011	IS		ALWAYS	AUTO	Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number.
Laterality	0020,0060	CS		ANAP	USER	-
Request Attributes Sequence	0040,0275	SQ		ANAP	MWL	Only present when patient demographics received from RIS.
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	-
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	MWL	-
>Requested Procedure ID	0040,1001	SH		ALWAYS	MWL	-
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	-
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	-
Performed Procedure Step Description	0040,0254	LO		VNAP	MWL, USER	-
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	AUTO, MWL, USER	Only present when patient demographics received from RIS.
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO, MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>Context Identifier	0008,010F	CS		VNAP	MWL	-
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	AUTO, MWL, USER	Only present when patient demographics received from RIS. Maximum of 64 characters.

Table 151: MR Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	FIXED	applied value: MR
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	AUTO	-
>Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
>Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	-
>Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
>Instance Number	0020,0013	IS		ALWAYS	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-

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>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	MPPS	-

Table 152: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	-
Position Reference Indicator	0020,1040	LO		EMPTY	FIXED	-

Table 153: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Configured on the system.
Station Name	0008,1010	SH		ALWAYS	CONFIG	Same as the Host Name.
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-

Table 154: Enhanced General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	FIXED	Applied value: Philips Medical Systems
Manufacturer's Model Name	0008,1090	LO		ALWAYS	FIXED	
Device Serial Number	0018,1000	LO		ALWAYS	FIXED	System serial number.
Software Version(s)	0018,1020	LO		ALWAYS	FIXED	The release text of the original Image.

Table 155: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		EMPTY	FIXED	-

Table 156: Multi-frame Functional Groups Module (MR Spectroscopy)

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Number of Frames	0028,0008	IS		ALWAYS	AUTO	-
Shared Functional Groups Sequence	5200,9229	SQ		VNAP	AUTO	Always present in combination with the Per-frame Functional Groups Sequence (5200,9230)
>Pixel Measures Sequence	0028,9110	SQ		ALWAYS	AUTO	-
>>Slice Thickness	0018,0050	DS		ANAP	AUTO	-
>>Pixel Spacing	0028,0030	DS		ANAP	AUTO	-
>Plane Position Sequence	0020,9113	SQ		ALWAYS	AUTO	-
>>Image Position (Patient)	0020,0032	DS		ANAP	AUTO	-
>Plane Orientation Sequence	0020,9116	SQ		ALWAYS	AUTO	-
>>Image Orientation (Patient)	0020,0037	DS		ANAP	AUTO	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	if scan was planned on other scan.
>>Purpose of Reference Code Sequence	0040,A170	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>>Referenced Frame Number	0008,1160	IS		ANAP	AUTO	-
>Cardiac Synchronization Sequence	0018,9118	SQ		ANAP	AUTO	-

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>>Nominal Cardiac Trigger Delay Time	0020,9153	FD		ALWAYS	AUTO	-
>>R - R Interval Time Nominal	0020,9251	FD		ANAP	AUTO	-
>Respiratory Synchronization Sequence	0020,9253	SQ		ANAP	AUTO	-
>>Respiratory Interval Time	0020,9254	FD		ALWAYS	AUTO	-
>>Nominal Respiratory Trigger Delay Time	0020,9255	FD		ALWAYS	AUTO	-
>MR Spectroscopy Frame Type Sequence	0018,9227	SQ		ALWAYS	AUTO	-
>>Frame Type	0008,9007	CS		ALWAYS	AUTO	-
>>Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
>>Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	-
>>Complex Image Component	0008,9208	CS		ALWAYS	AUTO	-
>>Acquisition Contrast	0008,9209	CS		ALWAYS	AUTO	-
>MR Timing and Related Parameters Sequence	0018,9112	SQ		ALWAYS	AUTO	-
>>Repetition Time	0018,0080	DS		ANAP	AUTO	-
>>Echo Train Length	0018,0091	IS		ANAP	AUTO	-
>>Flip Angle	0018,1314	DS		ANAP	AUTO	-
>>Operating Mode Sequence	0018,9176	SQ		ANAP	AUTO	-
>>>Operating Mode Type	0018,9177	CS		ALWAYS	AUTO	-
>>>Operating Mode	0018,9178	CS		ALWAYS	AUTO	-
>>Gradient Output Type	0018,9180	CS		ANAP	AUTO	-
>>Gradient Output	0018,9182	FD		ANAP	AUTO	-
>>Specific Absorption Rate Sequence	0018,9239	SQ		ANAP	AUTO	-
>>>Specific Absorption Rate Definition	0018,9179	CS		ALWAYS	AUTO	-
>>>Specific Absorption Rate Value	0018,9181	FD		ALWAYS	AUTO	-
>>RF Echo Train Length	0018,9240	US		ANAP	AUTO	-
>>Gradient Echo Train Length	0018,9241	US		ANAP	AUTO	-
>MR Spectroscopy FOV/Geometry Sequence	0018,9103	SQ		ALWAYS	AUTO	-
>>Percent Sampling	0018,0093	DS		ANAP	AUTO	-
>>Percent Phase Field of View	0018,0094	DS		ANAP	AUTO	-
>>Spectroscopy Acquisition Phase Rows	0018,9095	UL		ANAP	AUTO	-
>>Spectroscopy Acquisition Data Columns	0018,9127	UL		ANAP	AUTO	-
>>Spectroscopy Acquisition Out-of-plane Phase Steps	0018,9159	UL		ANAP	AUTO	-
>>Spectroscopy Acquisition Phase Columns	0018,9234	UL		ANAP	AUTO	-
>MR Echo Sequence	0018,9114	SQ		ALWAYS	AUTO	-
>>Effective Echo Time	0018,9082	FD		ANAP	AUTO	-
>MR Modifier Sequence	0018,9115	SQ		ALWAYS	AUTO	-
>>Inversion Recovery	0018,9009	CS		ANAP	AUTO	-
>>Flow Compensation	0018,9010	CS		ANAP	AUTO	-
>>Spoiling	0018,9016	CS		ANAP	AUTO	-
>>T2 Preparation	0018,9021	CS		ANAP	AUTO	-
>>Spectrally Selected Excitation	0018,9026	CS		ANAP	AUTO	-
>>Spatial Pre-saturation	0018,9027	CS		ANAP	AUTO	-
>>Partial Fourier Direction	0018,9036	CS		ANAP	AUTO	-

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>>Parallel Reduction Factor In-plane	0018,9069	FD		ANAP	AUTO	-
>>Parallel Acquisition	0018,9077	CS		ANAP	AUTO	-
>>Parallel Acquisition Technique	0018,9078	CS		ANAP	AUTO	-
>>Inversion Times	0018,9079	FD		ANAP	AUTO	-
>>Partial Fourier	0018,9081	CS		ANAP	AUTO	-
>>Parallel Reduction Factor out-of-plane	0018,9155	FD		ANAP	AUTO	-
>>Parallel Reduction Factor Second In-plane	0018,9168	FD		ANAP	AUTO	-
>>Flow Compensation Direction	0018,9183	CS		ANAP	AUTO	-
>MR Receive Coil Sequence	0018,9042	SQ		ALWAYS	AUTO	-
>>Receive Coil Name	0018,1250	SH		ANAP	AUTO	-
>>Receive Coil Manufacturer Name	0018,9041	LO		EMPTY	AUTO	-
>>Receive Coil Type	0018,9043	CS		ANAP	AUTO	-
>>Quadrature Receive Coil	0018,9044	CS		ANAP	AUTO	-
>>Multi-Coil Definition Sequence	0018,9045	SQ		ANAP	AUTO	-
>>>Multi-Coil Element Name	0018,9047	SH		ALWAYS	AUTO	-
>>>Multi-Coil Element Used	0018,9048	CS		ALWAYS	AUTO	-
>MR Transmit Coil Sequence	0018,9049	SQ		ANAP		-
>>Transmit Coil Name	0018,1251	SH		ALWAYS	AUTO	-
>>Transmit Coil Manufacturer Name	0018,9050	LO		EMPTY	FIXED	-
>>Transmit Coil Type	0018,9051	CS		ANAP	AUTO	-
>MR Diffusion Sequence	0018,9117	SQ		ANAP	AUTO	-
>>Diffusion Directionality	0018,9075	CS		ANAP	AUTO	-
>>Diffusion Gradient Direction Sequence	0018,9076	SQ		ANAP	AUTO	-
>>>Diffusion Gradient Orientation	0018,9089	FD		ANAP	AUTO	-
>>Diffusion b-value	0018,9087	FD		ANAP	AUTO	-
>>Diffusion Anisotropy Type	0018,9147	CS		ANAP	AUTO	Applied value: FRACTIONAL
>>Diffusion b-matrix Sequence	0018,9601	SQ		ANAP	AUTO	-
>MR Averages Sequence	0018,9119	SQ		ALWAYS	AUTO	-
>>Number of Averages	0018,0083	DS		ANAP	AUTO	-
>MR Spatial Saturation Sequence	0018,9107	SQ		ANAP	AUTO	if slab information is present
>>Slab Thickness	0018,9104	FD		ALWAYS	AUTO	-
>>Slab Orientation	0018,9105	FD		ALWAYS	AUTO	-
>>Mid Slab Position	0018,9106	FD		ALWAYS	AUTO	-
>MR Velocity Encoding Sequence	0018,9197	SQ		ANAP	AUTO	-
>>Velocity Encoding Direction	0018,9090	FD		ANAP	AUTO	-
>>Velocity Encoding Minimum Value	0018,9091	FD		ANAP	AUTO	Applied value: 0.0
>>Velocity Encoding Maximum Value	0018,9217	FD		ANAP	AUTO	-
>Frame Anatomy Sequence	0020,9071	SQ		ANAP	AUTO	-
>>Frame Laterality	0020,9072	CS		ALWAYS	AUTO	Value from examcard.
>>Anatomic Region Sequence	0008,2218	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	COPY	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>>>Code Meaning	0008,0104	LO		ALWAYS	COPY	Value from examcard from STANDARD table, possibly translated.
Per-frame Functional Groups Sequence	5200,9230	SQ		ALWAYS	AUTO	Always present in combination with the Shared Functional Groups Sequence (5200,9229)
>Pixel Measures Sequence	0028,9110	SQ		ALWAYS	AUTO	-
>>Slice Thickness	0018,0050	DS		ANAP	AUTO	-

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>>Pixel Spacing	0028,0030	DS		ANAP	AUTO	-
>Frame Content Sequence	0020,9111	SQ		ALWAYS	AUTO	-
>>Frame Acquisition Datetime	0018,9074	DT		ANAP	AUTO	-
>>Frame Reference Datetime	0018,9151	DT		ANAP	AUTO	-
>>Frame Acquisition Duration	0018,9220	FD		ANAP	AUTO	-
>>Stack ID	0020,9056	SH		ANAP	AUTO	if scan contains stacks.
>>In-Stack Position Number	0020,9057	UL		ANAP	AUTO	-
>Plane Position Sequence	0020,9113	SQ		ALWAYS	AUTO	-
>>Image Position (Patient)	0020,0032	DS		ANAP	AUTO	-
>Plane Orientation Sequence	0020,9116	SQ		ALWAYS	AUTO	-
>>Image Orientation (Patient)	0020,0037	DS		ANAP	AUTO	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	if scan was planned on other scan.
>>Purpose of Reference Code Sequence	0040,A170	SQ		ALWAYS	AUTO	-
>>>Code Value	0008,0100	SH		ALWAYS	AUTO	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
>>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>>Referenced Frame Number	0008,1160	IS		ANAP	AUTO	-
>Cardiac Synchronization Sequence	0018,9118	SQ		ALWAYS	AUTO	-
>>Nominal Cardiac Trigger Delay Time	0020,9153	FD		ALWAYS	AUTO	-
>>R - R Interval Time Nominal	0020,9251	FD		ANAP	AUTO	-
>MR Timing and Related Parameters Sequence	0018,9112	SQ		ALWAYS	AUTO	-
>>Repetition Time	0018,0080	DS		ANAP	AUTO	-
>>Echo Train Length	0018,0091	IS		ANAP	AUTO	-
>>Flip Angle	0018,1314	DS		ANAP	AUTO	-
>>Operating Mode Sequence	0018,9176	SQ		ANAP	AUTO	-
>>>Operating Mode Type	0018,9177	CS		ALWAYS	AUTO	-
>>>Operating Mode	0018,9178	CS		ALWAYS	AUTO	-
>>Gradient Output Type	0018,9180	CS		ANAP	AUTO	-
>>Gradient Output	0018,9182	FD		ANAP	AUTO	-
>>Specific Absorption Rate Sequence	0018,9239	SQ		ANAP	AUTO	-
>>>Specific Absorption Rate Definition	0018,9179	CS		ALWAYS	AUTO	-
>>>Specific Absorption Rate Value	0018,9181	FD		ALWAYS	AUTO	-
>>RF Echo Train Length	0018,9240	US		ANAP	AUTO	-
>>Gradient Echo Train Length	0018,9241	US		ANAP	AUTO	-
>MR Echo Sequence	0018,9114	SQ		ALWAYS	AUTO	-
>>Effective Echo Time	0018,9082	FD		ANAP	AUTO	-
>Respiratory Synchronization Sequence	0020,9253	SQ		ANAP	AUTO	-
>>Respiratory Interval Time	0020,9254	FD		ALWAYS	AUTO	-
>>Nominal Respiratory Trigger Delay Time	0020,9255	FD		ALWAYS	AUTO	-
>MR Modifier Sequence	0018,9115	SQ		ALWAYS	AUTO	-
>>Inversion Recovery	0018,9009	CS		ANAP	AUTO	-
>>Flow Compensation	0018,9010	CS		ANAP	AUTO	-
>>Spoiling	0018,9016	CS		ANAP	AUTO	-
>>T2 Preparation	0018,9021	CS		ANAP	AUTO	-
>>Spectrally Selected Excitation	0018,9026	CS		ANAP	AUTO	-
>>Spatial Pre-saturation	0018,9027	CS		ANAP	AUTO	-
>>Partial Fourier Direction	0018,9036	CS		ANAP	AUTO	-

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>>Parallel Reduction Factor In-plane	0018,9069	FD		ANAP	AUTO	-
>>Parallel Acquisition	0018,9077	CS		ANAP	AUTO	-
>>Parallel Acquisition Technique	0018,9078	CS		ANAP	AUTO	-
>>Inversion Times	0018,9079	FD		ANAP	AUTO	-
>>Partial Fourier	0018,9081	CS		ANAP	AUTO	-
>>Parallel Reduction Factor out-of-plane	0018,9155	FD		ANAP	AUTO	-
>>Parallel Reduction Factor Second In-plane	0018,9168	FD		ANAP	AUTO	-
>>Flow Compensation Direction	0018,9183	CS		ANAP	AUTO	-
>MR Receive Coil Sequence	0018,9042	SQ		ANAP		-
>>Receive Coil Name	0018,1250	SH		ALWAYS	AUTO	-
>>Receive Coil Manufacturer Name	0018,9041	LO		EMPTY	FIXED	-
>>Receive Coil Type	0018,9043	CS		ANAP	AUTO	-
>>Quadrature Receive Coil	0018,9044	CS		ANAP	AUTO	-
>>Multi-Coil Definition Sequence	0018,9045	SQ		ANAP	AUTO	-
>>>Multi-Coil Element Name	0018,9047	SH		ALWAYS	AUTO	-
>>>Multi-Coil Element Used	0018,9048	CS		ALWAYS	AUTO	-
>MR Transmit Coil Sequence	0018,9049	SQ		ALWAYS	AUTO	-
>>Transmit Coil Name	0018,1251	SH		ALWAYS	AUTO	-
>>Transmit Coil Manufacturer Name	0018,9050	LO		EMPTY	FIXED	-
>>Transmit Coil Type	0018,9051	CS		ANAP	AUTO	-
>MR Diffusion Sequence	0018,9117	SQ		ANAP	AUTO	-
>>Diffusion Directionality	0018,9075	CS		ANAP	AUTO	-
>>Diffusion Gradient Direction Sequence	0018,9076	SQ		ANAP	AUTO	-
>>>Diffusion Gradient Orientation	0018,9089	FD		ANAP	AUTO	-
>>Diffusion b-value	0018,9087	FD		ANAP	AUTO	-
>>Diffusion Anisotropy Type	0018,9147	CS		ANAP	AUTO	-
>Frame Anatomy Sequence	0020,9071	SQ		ALWAYS	AUTO	-
>>Frame Laterality	0020,9072	CS		ALWAYS	AUTO	Value from examcard.
>>Anatomic Region Sequence	0008,2218	SQ		ALWAYS	COPY	-
>>>Code Value	0008,0100	SH		ALWAYS	COPY	-
>>>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>>>Code Meaning	0008,0104	LO		ALWAYS	COPY	Value from examcard from STANDARD table, possibly translated.
>MR Spectroscopy Frame Type Sequence	0018,9227	SQ		ALWAYS	AUTO	-
>>Frame Type	0008,9007	CS		ALWAYS	AUTO	-
>>Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
>>Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	-
>>Complex Image Component	0008,9208	CS		ALWAYS	AUTO	-
>>Acquisition Contrast	0008,9209	CS		ALWAYS	AUTO	-
>MR Spectroscopy FOV/Geometry Sequence	0018,9103	SQ		ALWAYS	AUTO	-
>>Percent Sampling	0018,0093	DS		ANAP	AUTO	-
>>Percent Phase Field of View	0018,0094	DS		ANAP	AUTO	-
>>Spectroscopy Acquisition Phase Rows	0018,9095	UL		ANAP	AUTO	-
>>Spectroscopy Acquisition Data Columns	0018,9127	UL		ANAP	AUTO	-

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>>Spectroscopy Acquisition Out-of-plane Phase Steps	0018,9159	UL		ANAP	AUTO	-
>>Spectroscopy Acquisition Phase Columns	0018,9234	UL		ANAP	AUTO	-
>MR Averages Sequence	0018,9119	SQ		ALWAYS	AUTO	-
>>Number of Averages	0018,0083	DS		ANAP	AUTO	-
>MR Spatial Saturation Sequence	0018,9107	SQ		ANAP	AUTO	if slab information is present
>>Slab Thickness	0018,9104	FD		ALWAYS	AUTO	-
>>Slab Orientation	0018,9105	FD		ALWAYS	AUTO	-
>>Mid Slab Position	0018,9106	FD		ALWAYS	AUTO	-
>MR Velocity Encoding Sequence	0018,9197	SQ		ANAP	AUTO	-
>>Velocity Encoding Direction	0018,9090	FD		ANAP	AUTO	-
>>Velocity Encoding Minimum Value	0018,9091	FD		ANAP	AUTO	Applied value: 0.0
>>Velocity Encoding Maximum Value	0018,9217	FD		ANAP	AUTO	-

Table 157: Multi-frame Dimension Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Dimension Organization Sequence	0020,9221	SQ		VNAP	AUTO	-
>Dimension Organization UID	0020,9164	UI		ALWAYS	AUTO	-
Dimension Index Sequence	0020,9222	SQ		VNAP	AUTO	-
>Dimension Organization UID	0020,9164	UI		ANAP	AUTO	-
>Dimension Index Pointer	0020,9165	AT		ALWAYS	AUTO	-
>Functional Group Pointer	0020,9167	AT		ANAP	AUTO	-
>Dimension Index Private Creator	0020,9213	LO		ANAP	AUTO	-
>Functional Group Private Creator	0020,9238	LO		ANAP	AUTO	-

Table 158: Cardiac Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Low R-R Value	0018,1081	IS		ANAP	AUTO	-
High R-R Value	0018,1082	IS		ANAP	AUTO	-
Intervals Acquired	0018,1083	IS		ANAP	AUTO	-
Intervals Rejected	0018,1084	IS		ANAP	AUTO	-
Cardiac Synchronization Technique	0018,9037	CS		ANAP	AUTO	-
Cardiac R-R Interval Specified	0018,9070	FD		ANAP	AUTO	-
Cardiac Signal Source	0018,9085	CS		ANAP	AUTO	-
Cardiac Beat Rejection Technique	0018,9169	CS		ANAP	AUTO	-

Table 159: Respiratory Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Respiratory Motion Compensation Technique	0018,9170	CS		ANAP	AUTO	-
Respiratory Signal Source	0018,9171	CS		ANAP	AUTO	-
Respiratory Trigger Delay Threshold	0020,9256	FD		ANAP	AUTO	-

Table 160: Bulk Motion Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Bulk Motion Compensation Technique	0018,9172	CS		ANAP	AUTO	Applied value: NONE

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Table 161: MR Spectroscopy Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Spectral Width	0018,9052	FD		ANAP	AUTO	-
Chemical Shift Reference	0018,9053	FD	Value 1: 4.68	ANAP	AUTO	Applied value: 1:4.68
Volume Localization Technique	0018,9054	CS		ANAP	AUTO	-
De-coupling	0018,9059	CS		ANAP	AUTO	Enumerated Values: YES, NO
De-coupled Nucleus	0018,9060	CS		ANAP	AUTO	-
De-coupling Frequency	0018,9061	FD		ANAP	AUTO	-
De-coupling Method	0018,9062	CS		ANAP	AUTO	Defined Terms: MLEV, WALTZ, NARROWBAND. Required if De-coupling (0018,9059) equals YES.
De-coupling Chemical Shift Reference	0018,9063	FD	Value 1: 0.0, 4.67	ANAP	AUTO	Applied value: 4.67
Time Domain Filtering	0018,9065	CS		ANAP	AUTO	-
Number of Zero fills	0018,9066	US		ANAP	AUTO	-
Baseline Correction	0018,9067	CS		ANAP	AUTO	-
Transmitter Frequency	0018,9098	FD		ANAP	AUTO	-
Frequency Correction	0018,9101	CS		ANAP	AUTO	-
Volume Localization Sequence	0018,9126	SQ		ANAP		-
>Slab Thickness	0018,9104	FD		ALWAYS	AUTO	-
>Slab Orientation	0018,9105	FD		ALWAYS	AUTO	-
>Mid Slab Position	0018,9106	FD		ANAP	AUTO	-
First Order Phase Correction	0018,9198	CS		ANAP	AUTO	-
Water Referenced Phase Correction	0018,9199	CS		ANAP	AUTO	-
Acquisition Datetime	0008,002A	DT		ANAP	AUTO	-
Source Image Evidence Sequence	0008,9154	SQ		ANAP	AUTO	Required if the Source Image Sequence (0008,2112) is present.
>Referenced Series Sequence	0008,1115	SQ		ANAP	AUTO	-
>>Referenced SOP Sequence	0008,1199	SQ		ALWAYS	AUTO	-
>>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
>Study Instance UID	0020,000D	UI		ALWAYS	AUTO	-
Magnetic Field Strength	0018,0087	DS		ANAP	AUTO	-
Content Qualification	0018,9004	CS		ALWAYS	AUTO	-
k-space Filtering	0018,9064	CS		ANAP	AUTO	-
Acquisition Duration	0018,9073	FD		ANAP	AUTO	Required if Image Type (0008,0008) Value 1 is ORIGINAL or MIXED. May be present otherwise.
Resonant Nucleus	0018,9100	CS		ANAP	AUTO	Applied values: 129XE, 13C, 19F, 1H, 23NA, 31P, 3HE, 7LI, OTHER
Applicable Safety Standard Agency	0018,9174	CS		ALWAYS	AUTO	-
Acquisition Number	0020,0012	IS		ANAP	AUTO	-
Image Comments	0020,4000	LT		ANAP	AUTO	-
Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	-

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Complex Image Component	0008,9208	CS		ALWAYS	AUTO	-
Acquisition Contrast	0008,9209	CS		ALWAYS	AUTO	Applied values: MIXED, PROTON_DENSITY, SPECTROSCOPY, T1, T2, UNKNOWN

Table 162: MR Spectroscopy Pulse Sequence Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Pulse Sequence Name	0018,9005	SH		ANAP	AUTO	-
Echo Pulse Sequence	0018,9008	CS		ANAP	AUTO	-
Multiple Spin Echo	0018,9011	CS		ANAP	AUTO	-
Multi-planar Excitation	0018,9012	CS		ANAP	AUTO	-
Steady State Pulse Sequence	0018,9017	CS		ANAP	AUTO	-
Echo Planar Pulse Sequence	0018,9018	CS		ANAP	AUTO	-
Spectrally Selected Suppression	0018,9025	CS		ANAP	AUTO	-
Geometry of k-Space Traversal	0018,9032	CS		ANAP	AUTO	-
Segmented k-Space Traversal	0018,9033	CS		ANAP	AUTO	-
Rectilinear Phase Encode Reordering	0018,9034	CS		ANAP	AUTO	-
Number of k-Space Trajectories	0018,9093	US		ANAP	AUTO	-
Coverage of k-Space	0018,9094	CS		ANAP	AUTO	-
MR Spectroscopy Acquisition Type	0018,9200	CS		ANAP	AUTO	-

Table 163: MR Spectroscopy Data Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rows	0028,0010	US		ALWAYS	AUTO	-
Columns	0028,0011	US		ALWAYS	AUTO	-
Data Point Rows	0028,9001	UL		ALWAYS	AUTO	Applied value: 1
Data Point Columns	0028,9002	UL		ALWAYS	AUTO	-
Signal Domain Columns	0028,9003	CS		ALWAYS	AUTO	-
Data Representation	0028,9108	CS		ALWAYS	AUTO	-
First Order Phase Correction Angle	5600,0010	OF		ANAP	AUTO	-
Spectroscopy Data	5600,0020	OF		ALWAYS	AUTO	-

Table 164: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ALWAYS	AUTO	
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	-

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Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	FIXED	-

8.1.1.6. Raw Data Storage SOP Class

Table 165: IOD of Created Raw Data Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Frame of Reference	Frame of Reference Module	CONDITIONAL
Frame of Reference	Synchronization Module	CONDITIONAL
Equipment	General Equipment Module	ALWAYS
Raw Data	Acquisition Context Module	ALWAYS
Raw Data	Raw Data Module	ALWAYS
Raw Data	SOP Common Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 166: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	MWL, USER	-
Patient ID	0010,0020	LO		ALWAYS	MWL, USER	-
Patient's Birth Date	0010,0030	DA		ALWAYS	MWL, USER	-
Patient's Sex	0010,0040	CS		ALWAYS	MWL, USER	-
Patient's Age	0010,1010	AS		ANAP	COPY	-
Other Patient IDs	0010,1000	LO		VNAP	MWL, USER	-
Ethnic Group	0010,2160	SH		ANAP	MWL, USER	-
Patient Comments	0010,4000	LT		ANAP	MWL	-

Table 167: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	AUTO, MWL	-
Study Time	0008,0030	TM		ALWAYS	AUTO, MWL	-
Accession Number	0008,0050	SH		ALWAYS	AUTO, MWL, USER	-
Referring Physician's Name	0008,0090	PN		VNAP	MWL, USER	-
Study Description	0008,1030	LO		VNAP	MWL, USER	-
Procedure Code Sequence	0008,1032	SQ		ANAP	MWL, USER	-
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-

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>Context Identifier	0008,010F	CS		ANAP	MWL	-
Referenced Study Sequence	0008,1110	SQ		ANAP	MWL	If received from RIS
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO, MWL	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO, MWL	-
Study Instance UID	0020,000D	UI		ALWAYS	AUTO, MWL	-
Study ID	0020,0010	SH		ALWAYS	AUTO	-

Table 168: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		ALWAYS	MWL	-
Patient's Size	0010,1020	DS		ANAP	MWL	-
Patient's Weight	0010,1030	DS		ALWAYS	MWL, USER	-
Occupation	0010,2180	SH		ANAP	MWL	-
Additional Patient History	0010,21B0	LT		ANAP	COPY	-

Table 169: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Modality	0008,0060	CS		ALWAYS	AUTO	Applied value: MR
Series Description	0008,103E	LO		ANAP	AUTO, USER	-
Performing Physician's Name	0008,1050	PN		ANAP	AUTO	-
Operators' Name	0008,1070	PN		VNAP	AUTO	-
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	Applied value: 1.2.840.10008.3.1.2.3.3
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
Body Part Examined	0018,0015	CS		ANAP	AUTO	If ExamCard scan
Protocol Name	0018,1030	LO		ALWAYS	USER	Scan name
Patient Position	0018,5100	CS		ANAP	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	Generated by MR system
Series Number	0020,0011	IS		ALWAYS	AUTO	Created dynamically at export. Contains the concatenation of the acquisition number and the private reconstruction number.
Laterality	0020,0060	CS		ANAP	USER	-
Request Attributes Sequence	0040,0275	SQ		ANAP	MWL	-
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	MWL	-
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	MWL, USER	-
>>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>>Coding Scheme Version	0008,0103	SH		ANAP	USER	-
>>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>>Context Group Version	0008,0106	DT		ANAP	MWL	-
>>Context Group Local Version	0008,0107	DT		ANAP	MWL	-

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>>Context Group Extension Flag	0008,010B	CS		ANAP	MWL	-
>>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>>Context Identifier	0008,010F	CS		ANAP	MWL	-
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	MWL	-
>Requested Procedure ID	0040,1001	SH		ALWAYS	MWL	-
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	AUTO	-
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	AUTO	-
Performed Procedure Step ID	0040,0253	SH		ALWAYS	AUTO	-
Performed Procedure Step Description	0040,0254	LO		VNAP	MWL, USER	-
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	MWL, USER	When retrieved from RIS, otherwise empty.
>Code Value	0008,0100	SH		ALWAYS	MWL, USER	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	MWL, USER	-
>Coding Scheme Version	0008,0103	SH		ANAP	MWL, USER	-
>Code Meaning	0008,0104	LO		ALWAYS	MWL, USER	-
>Mapping Resource	0008,0105	CS		ANAP	MWL	-
>Context Group Version	0008,0106	DT		ANAP	MWL	-
>Context Group Local Version	0008,0107	DT		ANAP	MWL	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	MWL	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	MWL	-
>Context Identifier	0008,010F	CS		ANAP	MWL	-
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	MWL, USER	Editable i.e can be changed on Console, default first 64 chars copied from RIS

Table 170: Frame of Reference Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Frame of Reference UID	0020,0052	UI		ALWAYS	AUTO	-
Position Reference Indicator	0020,1040	LO		EMPTY	AUTO	-

Table 171: Synchronization Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Synchronization Trigger	0018,106A	CS		ALWAYS	AUTO	-
Acquisition Time Synchronized	0018,1800	CS		ALWAYS	AUTO	-
Synchronization Frame of Reference UID	0020,0200	UI		ALWAYS	AUTO	-

Table 172: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	AUTO	Applied value: Philips Medical Systems
Institution Name	0008,0080	LO		ALWAYS	CONFIG	Configured on the system.
Station Name	0008,1010	SH		ALWAYS	CONFIG	Same as the Host Name.
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	

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Device Serial Number	0018,1000	LO		ALWAYS	AUTO	System serial number.
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	The release text of the original Image.

Table 173: Acquisition Context Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Acquisition Context Sequence	0040,0555	SQ		ALWAYS	AUTO	Empty

Table 174: Raw Data Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Acquisition Datetime	0008,002A	DT		ANAP	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Creator-Version UID	0008,9123	UI		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		VNAP	AUTO	-

Table 175: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ALWAYS	AUTO	Default: ISO_IR 100
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	-
Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	Applied value: 1.2.840.10008.5.1.4.1.1.66
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

8.1.1.7. Secondary Capture Image Storage SOP Class

Table 176: IOD of Created Secondary Capture Image Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Equipment	General Equipment Module	CONDITIONAL
Equipment	SC Equipment Module	ALWAYS
Image	General Image Module	ALWAYS
Image	Image Pixel Module	ALWAYS
Image	SC Image Module	ALWAYS
Image	SOP Common Module	ALWAYS

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	Extended DICOM and Private attributes	ALWAYS

Table 177: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	COPY	-
Patient ID	0010,0020	LO		ALWAYS	COPY	-
Patient's Birth Date	0010,0030	DA		ALWAYS	CONFIG	-
Patient's Sex	0010,0040	CS		ALWAYS	COPY	-
Other Patient IDs	0010,1000	LO		ANAP	COPY	-

Table 178: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	COPY	-
Study Time	0008,0030	TM		ALWAYS	COPY	-
Accession Number	0008,0050	SH		ALWAYS	COPY	-
Referring Physician's Name	0008,0090	PN		VNAP	COPY	-
Study Description	0008,1030	LO		VNAP	COPY	-
Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	-
>Code Value	0008,0100	SH		ALWAYS	COPY	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>Coding Scheme Version	0008,0103	SH		ANAP	COPY	-
>Code Meaning	0008,0104	LO		ALWAYS	COPY	-
>Context Group Local Version	0008,0107	DT		ANAP	COPY	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	COPY	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	COPY	-
Referenced Study Sequence	0008,1110	SQ		ANAP	COPY	if present in original study.
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	COPY	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	COPY	-
Study Instance UID	0020,000D	UI		ALWAYS	COPY	-
Study ID	0020,0010	SH		ALWAYS	COPY	-

Table 179: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		ANAP	COPY	-
Patient's Age	0010,1010	AS		ANAP	COPY	-
Patient's Size	0010,1020	DS		ANAP	COPY	-
Patient's Weight	0010,1030	DS		ALWAYS	COPY	-
Additional Patient History	0010,21B0	LT		ANAP	COPY	-

Table 180: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Series Description	0008,103E	LO		ANAP	AUTO, USER	-
Performing Physician's Name	0008,1050	PN		ANAP	AUTO	-
Operators' Name	0008,1070	PN		EMPTY	AUTO	-

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Referenced Performed Procedure Step Sequence	0008,1111	SQ		ANAP	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
Body Part Examined	0018,0015	CS		ANAP	COPY	-
Protocol Name	0018,1030	LO		ALWAYS	COPY	-
Patient Position	0018,5100	CS		ANAP	AUTO	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		ANAP	COPY	-
Smallest Pixel Value in Series	0028,0108	US/ SS		ANAP	AUTO	-
Largest Pixel Value in Series	0028,0109	US/ SS		ANAP	AUTO	-
Request Attributes Sequence	0040,0275	SQ		ANAP	COPY	-
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	CONFIG	-
>Scheduled Protocol Code Sequence	0040,0008	SQ		ANAP	COPY	-
>>Code Value	0008,0100	SH		ALWAYS	COPY	-
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>>Coding Scheme Version	0008,0103	SH		ANAP	COPY	-
>>Code Meaning	0008,0104	LO		ALWAYS	COPY	-
>>Mapping Resource	0008,0105	CS		ANAP	COPY	-
>>Context Group Version	0008,0106	DT		ANAP	COPY	-
>>Context Group Local Version	0008,0107	DT		ANAP	COPY	-
>>Context Group Extension Flag	0008,010B	CS		ANAP	COPY	-
>>Context Group Extension Creator UID	0008,010D	UI		ANAP	COPY	-
>>Context Identifier	0008,010F	CS		ANAP	COPY	-
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	COPY	-
>Requested Procedure ID	0040,1001	SH		ALWAYS	COPY	-
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	COPY	-
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	COPY	-
Performed Procedure Step ID	0040,0253	SH		ALWAYS	COPY	-
Performed Procedure Step Description	0040,0254	LO		VNAP	COPY	-
Performed Protocol Code Sequence	0040,0260	SQ		ANAP	COPY	-
>Code Value	0008,0100	SH		ALWAYS	COPY	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>Coding Scheme Version	0008,0103	SH		ANAP	COPY	-
>Code Meaning	0008,0104	LO		ALWAYS	COPY	-
>Context Group Local Version	0008,0107	DT		ANAP	COPY	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	COPY	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	COPY	-
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	COPY	Maximum of 64 characters

Table 181: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	AUTO	Applied value: Philips Medical systems
Institution Name	0008,0080	LO		ALWAYS	CONFIG	-
Institution Address	0008,0081	ST		ANAP	CONFIG	-
Station Name	0008,1010	SH		ALWAYS	AUTO	-
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-

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Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ANAP	AUTO	-

Table 182: SC Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	Applied value: MR
Conversion Type	0008,0064	CS		ALWAYS	AUTO	Applied Values: SYN, WSD
Secondary Capture Device Manufacturer	0018,1016	LO		ANAP	AUTO	-
Secondary Capture Device Manufacturer's Model Name	0018,1018	LO		ANAP	AUTO	-
Secondary Capture Device Software Version(s)	0018,1019	LO		ANAP	AUTO	-

Table 183: General Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Type	0008,0008	CS		ALWAYS	AUTO	
Content Date	0008,0023	DA		ALWAYS	AUTO	-
Content Time	0008,0033	TM		ALWAYS	AUTO	-
Acquisition Number	0020,0012	IS		ALWAYS	AUTO	-
Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Patient Orientation	0020,0020	CS		EMPTY	AUTO	-
Image Comments	0020,4000	LT		EMPTY	AUTO	-
Lossy Image Compression	0028,2110	CS		ALWAYS	AUTO	Applied value: 00

Table 184: Image Pixel Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Samples per Pixel	0028,0002	US		ALWAYS	AUTO	Applied value: 1, 3
Photometric Interpretation	0028,0004	CS		ALWAYS	IMPLICIT	Applied values: MONOCHROME2, RGB
Planar Configuration	0028,0006	US		ANAP	AUTO	-
Rows	0028,0010	US		ALWAYS	AUTO	-
Columns	0028,0011	US		ALWAYS	AUTO	-
Pixel Aspect Ratio	0028,0034	IS		ALWAYS	AUTO	Applied value: (1,1)
Bits Allocated	0028,0100	US		ALWAYS	AUTO	-
Bits Stored	0028,0101	US		ALWAYS	AUTO	-
High Bit	0028,0102	US		ALWAYS	AUTO	-
Pixel Representation	0028,0103	US		ALWAYS	AUTO	-
Pixel Data	7FE0,0010	O W/ OB		ALWAYS	AUTO	-

Table 185: SC Image Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Date of Secondary Capture	0018,1012	DA		ANAP	AUTO	-
Time of Secondary Capture	0018,1014	TM		ANAP	AUTO	-

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Table 186: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ALWAYS	AUTO	-
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
Instance Creation Time	0008,0013	TM		ALWAYS	AUTO	-
Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI		ALWAYS	AUTO	-
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

8.1.1.8. Grayscale Softcopy Presentation State Storage SOP Class

Table 187: IOD of Created Grayscale Softcopy Presentation State Storage SOP Class Instances

Information Entity	Module	Presence Of Module
Patient	Patient Module	ALWAYS
Study	General Study Module	ALWAYS
Study	Patient Study Module	CONDITIONAL
Series	General Series Module	ALWAYS
Series	Presentation Series Module	ALWAYS
Equipment	General Equipment Module	ALWAYS
Presentation State	Presentation State Identification Module	ALWAYS
Presentation State	Presentation State Relationship Module	ALWAYS
Presentation State	Display Shutter Module	CONDITIONAL
Presentation State	Overlay Plane Module	CONDITIONAL
Presentation State	Overlay Activation Module	CONDITIONAL
Presentation State	Displayed Area Module	CONDITIONAL
Presentation State	Graphic Annotation Module	CONDITIONAL
Presentation State	Spatial Transformation Module	CONDITIONAL
Presentation State	Graphic Layer Module	CONDITIONAL
Presentation State	Modality LUT Module	CONDITIONAL
Presentation State	Softcopy VOI LUT Module	CONDITIONAL
Presentation State	Softcopy Presentation LUT Module	ALWAYS
Presentation State	SOP Common Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 188: Patient Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Patient's Name	0010,0010	PN		ALWAYS	COPY	-
Patient ID	0010,0020	LO		ALWAYS	COPY	-
Patient's Birth Date	0010,0030	DA		ALWAYS	COPY	-

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Patient's Sex	0010,0040	CS		ALWAYS	COPY	-
Other Patient IDs	0010,1000	LO		VNAP	COPY	-
Ethnic Group	0010,2160	SH		ANAP	COPY	-
Patient Comments	0010,4000	LT		ANAP	COPY	-

Table 189: General Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Study Date	0008,0020	DA		ALWAYS	COPY	-
Study Time	0008,0030	TM		ALWAYS	COPY	-
Accession Number	0008,0050	SH		ALWAYS	COPY	-
Referring Physician's Name	0008,0090	PN		VNAP	COPY	-
Study Description	0008,1030	LO		VNAP	COPY	-
Procedure Code Sequence	0008,1032	SQ		ANAP	COPY	If present in original study
>Code Value	0008,0100	SH		ALWAYS	COPY	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>Coding Scheme Version	0008,0103	SH		ANAP	COPY	-
>Code Meaning	0008,0104	LO		ALWAYS	COPY	-
>Mapping Resource	0008,0105	CS		ANAP	COPY	-
>Context Group Version	0008,0106	DT		ANAP	COPY	-
>Context Group Local Version	0008,0107	DT		ANAP	COPY	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	COPY	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	COPY	-
Referenced Study Sequence	0008,1110	SQ		ANAP	AUTO	If present in original study.
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	COPY	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	COPY	-
Study Instance UID	0020,000D	UI		ALWAYS	COPY	-
Study ID	0020,0010	SH		ALWAYS	COPY	-

Table 190: Patient Study Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Admitting Diagnoses Description	0008,1080	LO		VNAP	COPY	-
Patient's Size	0010,1020	DS		VNAP	COPY	-
Patient's Weight	0010,1030	DS		ALWAYS	COPY	-
Occupation	0010,2180	SH		ANAP	COPY	-
Additional Patient History	0010,21B0	LT		ANAP	COPY	-

Table 191: General Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Series Date	0008,0021	DA		ALWAYS	AUTO	-
Series Time	0008,0031	TM		ALWAYS	AUTO	-
Series Description	0008,103E	LO		ANAP	AUTO, USER	-
Operators' Name	0008,1070	PN		EMPTY	AUTO	-
Referenced Performed Procedure Step Sequence	0008,1111	SQ		ALWAYS	AUTO	-
>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-

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Body Part Examined	0018,0015	CS		ANAP	COPY	-
Protocol Name	0018,1030	LO		ANAP	COPY	-
Patient Position	0018,5100	CS		ANAP	COPY	-
Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-
Series Number	0020,0011	IS		ALWAYS	AUTO	-
Laterality	0020,0060	CS		ANAP	COPY	-
Request Attributes Sequence	0040,0275	SQ		ANAP	COPY	-
>Scheduled Procedure Step Description	0040,0007	LO		VNAP	COPY	-
>Scheduled Procedure Step ID	0040,0009	SH		ALWAYS	COPY	-
>Requested Procedure ID	0040,1001	SH		ALWAYS	COPY	-
Performed Procedure Step Start Date	0040,0244	DA		ALWAYS	COPY	-
Performed Procedure Step Start Time	0040,0245	TM		ALWAYS	COPY	-
Performed Procedure Step ID	0040,0253	SH		ALWAYS	COPY	-
Performed Procedure Step Description	0040,0254	LO		ANAP	AUTO	-
Performed Protocol Code Sequence	0040,0260	SQ		VNAP	COPY	-
>Code Value	0008,0100	SH		ALWAYS	COPY	-
>Coding Scheme Designator	0008,0102	SH		ALWAYS	COPY	-
>Coding Scheme Version	0008,0103	SH		ANAP	COPY	-
>Code Meaning	0008,0104	LO		ALWAYS	AUTO	-
>Context Group Local Version	0008,0107	DT		ANAP	COPY	-
>Context Group Extension Flag	0008,010B	CS		ALWAYS	COPY	-
>Context Group Extension Creator UID	0008,010D	UI		ANAP	COPY	-
>Context Identifier	0008,010F	CS		ANAP	AUTO	-
Comments on the Performed Procedure Step	0040,0280	ST		ANAP	COPY	Maximum of 64 characters, Comments added on MR

Table 192: Presentation Series Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Modality	0008,0060	CS		ALWAYS	AUTO	-

Table 193: General Equipment Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Manufacturer	0008,0070	LO		ALWAYS	AUTO	applied value: Philips Medical Systems
Institution Name	0008,0080	LO		ALWAYS	CONFIG	-
Station Name	0008,1010	SH		ALWAYS	AUTO	Same as the host Name.
Institutional Department Name	0008,1040	LO		ALWAYS	CONFIG	-
Manufacturer's Model Name	0008,1090	LO		ALWAYS	AUTO	
Device Serial Number	0018,1000	LO		ALWAYS	AUTO	-
Software Version(s)	0018,1020	LO		ALWAYS	AUTO	-

Table 194: Presentation State Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation Creation Date	0070,0082	DA		ALWAYS	AUTO	-
Presentation Creation Time	0070,0083	TM		ALWAYS	AUTO	-

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Instance Number	0020,0013	IS		ALWAYS	AUTO	-
Content Label	0070,0080	CS	AS LAST SEEN, NEW AT IMPORT	ALWAYS	AUTO	applied values: AS LAST SEEN, NEW AT IMPORT
Content Description	0070,0081	LO		VNAP	AUTO	
Content Creator's Name	0070,0084	PN		VNAP	AUTO	Same as Manufacturer's Model name.

Table 195: Presentation State Relationship Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Referenced Series Sequence	0008,1115	SQ		ALWAYS	AUTO	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Series Instance UID	0020,000E	UI		ALWAYS	AUTO	-

Table 196: Display Shutter Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Shutter Presentation Value	0018,1622	US		ANAP	AUTO	Applied value: 0

Table 197: Overlay Plane Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Rows	6000,0010	US		ALWAYS	AUTO	-
Overlay Columns	6000,0011	US		ALWAYS	AUTO	-
Overlay Description	6000,0022	LO		ANAP	AUTO	-
Overlay Type	6000,0040	CS		ALWAYS	AUTO	-
Overlay Subtype	6000,0045	LO		ANAP	AUTO	-
Overlay Origin	6000,0050	SS		ALWAYS	AUTO	-
Overlay Bits Allocated	6000,0100	US		ALWAYS	AUTO	-
Overlay Bit Position	6000,0102	US		ALWAYS	AUTO	-
ROI Area	6000,1301	IS		ANAP	AUTO	-
ROI Mean	6000,1302	DS		ANAP	AUTO	-
ROI Standard Deviation	6000,1303	DS		ANAP	AUTO	-
Overlay Label	6000,1500	LO		EMPTY	AUTO	-
Overlay Data	6000,3000	O W/ OB		ALWAYS	AUTO	-

Table 198: Overlay Activation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Overlay Activation Layer	6000,1001	CS		ANAP	AUTO	applied value: 1

Table 199: Displayed Area Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Displayed Area Selection Sequence	0070,005A	SQ		ALWAYS	IMPLICIT	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	IMPLICIT	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	IMPLICIT	-
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	IMPLICIT	-

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>Displayed Area Top Left Hand Corner	0070,0052	SL		ALWAYS	IMPLICIT	-
>Displayed Area Bottom Right Hand Corner	0070,0053	SL		ALWAYS	IMPLICIT	-
>Presentation Size Mode	0070,0100	CS	MAGNIFY, SCALE TO FIT	ALWAYS	IMPLICIT	Applied values: MAGNIFY, SCALE TO FIT
>Presentation Pixel Spacing	0070,0101	DS		ANAP	IMPLICIT	Applied values: (0.0, 0.0)
>Presentation Pixel Aspect Ratio	0070,0102	IS		ANAP	IMPLICIT	-
>Presentation Pixel Magnification Ratio	0070,0103	FL		ANAP	IMPLICIT	Applied value: 1.0
>Zoom Mode	2001,103F	CS		VNAP	IMPLICIT	-

Table 200: Graphic Annotation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Annotation Sequence	0070,0001	SQ		ALWAYS	IMPLICIT	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	IMPLICIT	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	IMPLICIT	-
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	IMPLICIT	-
>Graphic Layer	0070,0002	CS		ALWAYS	IMPLICIT	-
>Text Object Sequence	0070,0008	SQ		ANAP	IMPLICIT	-
>>Anchor Point Annotation Units	0070,0004	CS		ALWAYS	IMPLICIT	-
>>Unformatted Text Value	0070,0006	ST		ALWAYS	IMPLICIT	-
>>Anchor Point	0070,0014	FL		ALWAYS	IMPLICIT	-
>>Anchor Point Visibility	0070,0015	CS		ALWAYS	IMPLICIT	-
>Graphic Object Sequence	0070,0009	SQ		ANAP	AUTO	-
>>Graphic Annotation Units	0070,0005	CS		ALWAYS	IMPLICIT	-
>>Graphic Dimensions	0070,0020	US		ALWAYS	IMPLICIT	-
>>Number of Graphic Points	0070,0021	US		ALWAYS	IMPLICIT	-
>>Graphic Data	0070,0022	FL		ALWAYS	IMPLICIT	-
>>Graphic Type	0070,0023	CS		ALWAYS	IMPLICIT	-
>>Graphic Filled	0070,0024	CS		ANAP	IMPLICIT	-

Table 201: Spatial Transformation Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Image Horizontal Flip	0070,0041	CS		ALWAYS	IMPLICIT	-
Image Rotation	0070,0042	US		ALWAYS	IMPLICIT	-

Table 202: Graphic Layer Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Graphic Layer Sequence	0070,0060	SQ		ALWAYS	IMPLICIT	-
>Graphic Layer	0070,0002	CS		ALWAYS	IMPLICIT	-
>Graphic Layer Order	0070,0062	IS		ALWAYS	IMPLICIT	-

Table 203: Modality LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Rescale Intercept	0028,1052	DS		ALWAYS	COPY	-
Rescale Slope	0028,1053	DS		ALWAYS	COPY	-

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Rescale Type	0028,1054	LO	Normalized, US, cm/s, mrad, ms, mm^2/s, s,%,/s, S/m, kPa, mmol, ppm, Hz, um^2/sec, 10^-3 mm^2/s	ALWAYS	COPY	no units, no units, cm/s, milliradian, ms, mm^2/s, s,%,/s, S/m, kPa, millimol, parts per million, Hz, um^2/s, mm^2/s

Table 204: Softcopy VOI LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Softcopy VOI LUT Sequence	0028,3110	SQ		ALWAYS	AUTO	-
>Referenced Image Sequence	0008,1140	SQ		ANAP	AUTO	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Window Center	0028,1050	DS		ALWAYS	AUTO	-
>Window Width	0028,1051	DS		ALWAYS	AUTO	-

Table 205: Softcopy Presentation LUT Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Presentation LUT Sequence	2050,0010	SQ		ANAP	AUTO	Present if Presentation LUT Shape not present
>LUT Descriptor	0028,3002	US /SS		ALWAYS	AUTO	-
>LUT Data	0028,3006	US /OW		ALWAYS	AUTO	-
Presentation LUT Shape	2050,0020	CS		ALWAYS	AUTO	-

Table 206: SOP Common Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Specific Character Set	0008,0005	CS	ISO 2022 IR 100, ISO 2022 IR 101, ISO 2022 IR 109, ISO 2022 IR 110, ISO 2022 IR 13, ISO 2022 IR 148, ISO 2022 IR 149, ISO 2022 IR 159, ISO 2022 IR 87, ISO_IR 100, ISO_IR 101, ISO_IR 109, ISO_IR 110, ISO_IR 126, ISO_IR 13, ISO_IR 144, ISO_IR 148	ALWAYS	AUTO	Default: ISO_IR 100.
Instance Creation Date	0008,0012	DA		ALWAYS	AUTO	-
Instance Creator UID	0008,0014	UI		ALWAYS	AUTO	-
SOP Class UID	0008,0016	UI	1.2.840.10008.5.1.4.1.1.1.1.1.1	ALWAYS	AUTO	Applied Value(s): 1.2.840.10008.5.1.4.1.1.11.1
SOP Instance UID	0008,0018	UI		ALWAYS	AUTO	-

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8.1.1.9. Media Storage Directory SOP Class

Table 207: IOD of Created Media Storage Directory SOP Class Instances

Information Entity	Module	Presence Of Module
	File-set Identification Module	ALWAYS
	Directory Information Module	ALWAYS
	Extended DICOM and Private attributes	ALWAYS

Table 208: File-set Identification Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
File-set ID	0004,1130	CS		ALWAYS	AUTO	-
Specific Character Set of File-set Descriptor File	0004,1142	CS		ANAP	AUTO, USER	Required to specify the expanded or replacement character set

Table 209: Directory Information Module

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Offset of the First Directory Record of the Root Directory Entity	0004,1200	UL		ALWAYS	AUTO	-
Offset of the Last Directory Record of the Root Directory Entity	0004,1202	UL		ALWAYS	AUTO	-
File-set Consistency Flag	0004,1212	US		ALWAYS	AUTO	Default 0x0000=0
Directory Record Sequence	0004,1220	SQ		VNAP	AUTO	-
>Offset of the Next Directory Record	0004,1400	UL		ALWAYS	AUTO	-
>Record In-use Flag	0004,1410	US		ALWAYS	AUTO	-
>Offset of Referenced Lower-Level Directory Entity	0004,1420	UL		ALWAYS	AUTO	-
>Directory Record Type	0004,1430	CS		ANAP	AUTO	-
>Private Record UID	0004,1432	UI		ANAP	AUTO	-
>Referenced File ID	0004,1500	CS		ANAP	AUTO	-
>Referenced SOP Class UID in File	0004,1510	UI		ANAP	AUTO	-
>Referenced SOP Instance UID in File	0004,1511	UI		ANAP	AUTO	-
>Referenced Transfer Syntax UID in File	0004,1512	UI		ANAP	AUTO	-
>Specific Character Set	0008,0005	CS		ANAP	AUTO	-
>Image Type	0008,0008	CS		ANAP	AUTO	-
>SOP Instance UID	0008,0018	UI		ANAP	AUTO	-
>Study Date	0008,0020	DA		ALWAYS	AUTO	-
>Series Date	0008,0021	DA		VNAP	COPY	-
>Study Time	0008,0030	TM		ALWAYS	COPY	-
>Series Time	0008,0031	TM		VNAP	COPY	-
>Accession Number	0008,0050	SH		VNAP	COPY	-
>Modality	0008,0060	CS		ALWAYS	COPY	-
>Study Description	0008,1030	LO		VNAP	COPY	-
>Referenced Series Sequence	0008,1115	SQ		VNAP	COPY	-
>Patient's Name	0010,0010	PN		ALWAYS	COPY	-
>Patient ID	0010,0020	LO		ALWAYS	COPY	-

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>Patient's Birth Date	0010,0030	DA		ALWAYS	COPY	-
>Patient's Sex	0010,0040	CS		ALWAYS	COPY	-
>Protocol Name	0018,1030	LO		VNAP	COPY	-
>Study Instance UID	0020,000D	UI		ALWAYS	COPY	-
>Series Instance UID	0020,000E	UI		ALWAYS	COPY	-
>Study ID	0020,0010	SH		ALWAYS	COPY	-
>Series Number	0020,0011	IS		ALWAYS	COPY	-
>Instance Number	0020,0013	IS		ALWAYS	AUTO	-
>Image Position (Patient)	0020,0032	DS		VNAP	COPY	-
>Image Orientation (Patient)	0020,0037	DS		VNAP	COPY	-
>Frame of Reference UID	0020,0052	UI		VNAP	COPY	-
>Performed Procedure Step Start Date	0040,0244	DA		VNAP	COPY	-
>Performed Procedure Step Description	0040,0254	LO		VNAP	COPY	-
>Content Label	0070,0080	CS		ALWAYS	COPY	-
>Content Description	0070,0081	LO		VNAP	COPY	-
>Presentation Creation Date	0070,0082	DA		ALWAYS	COPY	-
>Presentation Creation Time	0070,0083	TM		ALWAYS	COPY	-
>Content Creator's Name	0070,0084	PN		VNAP	COPY	-
>Icon Image Sequence	0088,0200	SQ		ANAP	AUTO	-
>>Pixel Spacing	0028,0030	DS		VNAP	COPY	-
>>Samples per Pixel	0028,0002	US		VNAP	COPY	-
>>Photometric Interpretation	0028,0004	CS		VNAP	AUTO	-
>>Rows	0028,0010	US		VNAP	AUTO	-
>>Columns	0028,0011	US		VNAP	AUTO	-
>>Pixel Aspect Ratio	0028,0034	IS		ANAP	AUTO	-
>>Bits Allocated	0028,0100	US		VNAP	COPY	-
>>Bits Stored	0028,0101	US		VNAP	COPY	-
>>High Bit	0028,0102	US		VNAP	COPY	-
>>Pixel Representation	0028,0103	US		VNAP	COPY	-

8.1.2. Attribute Mapping

The following table shows the relation between MWL, MPPS and image Storage attributes.

Table 210: Attribute mapping during Modality Workflow

Nr	Level	Attribute Name	MWL Find Tag	MPPS Create Tag	Related Store Tag	MPPS Set Tag
1	Patient	Patient’s Name	0010,0010	0010,0010	0010,0010	-
2		Patient ID	0010,0020	0010,0020	0010,0020	-
3		Patient's Birth Date	0010,0030	0010,0030	0010,0030	-
4		Patient's Sex	0010,0040	0010,0040	0010,0040	-
5	Study	Accession number	0008,0050	0008,0050	0008,0050	-
6		Patient’s Weight	0010,1030	-	0010,1030	-
7		Study Instance UID	0020,000D	0020,000D	0020,000D	-
8		Request Procedure Description	0032,1060	0032,1060	0032,1060	-
9		Scheduled Performing Physician’s Name	0040,0006	-	0040,0006	-

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Nr	Level	Attribute Name	MWL Find Tag	MPPS Create Tag	Related Store Tag	MPPS Set Tag
10		Request Procedure ID	0040,1001	0040,1001	0040,1001	-
11	Exam	Scheduled Procedure Step Start Date	0040,0002	0040,0244	0008,0020	-
12				0040,0250		
13		Scheduled Procedure Step Description	0040,0007	0040,0007	0040,0007	-
-		Performed Protocol Code Sequence	0040,0008	0040,0260	0040,0260 0040,0008	0040,0260
14		> Code Value	0008,0100	0008,0100	0008,0100	0008,0100
15		> Code Scheme Designator	0008,0102	0008,0102	0008,0102	0008,0102
16		> Coding Scheme Version	0008,0103	0008,0103	0008,0103	0008,0103
17		> Code Meaning	0008,0104	0008,0104	0008,0104	0040,0004
18		Scheduled Procedure Step ID	0040,0009	0040,0009	0040,0009	-
-		Scheduled Procedure Step Sequence	0040,0100	-	-	-
19		> Comments on the Scheduled Procedure Step	0040,0400	-	0032,4000	-
20			-	-	0040,0280	-
21		Performed Procedure Step ID	-	0040,0253	0040,0253	-
		Study ID	-	-	0020,0010	-
-	Series/ Image / Grayscale Softcopy	Performed Series Sequence	-	-	-	0040,0340
		> Referenced Image Sequence	-	-	-	0008,1140
22		>> Referenced SOP Class UID	-	-	0008,0016	0008,1150
23		>> Referenced SOP Instance UID	-	-	0008,0018	0008,1155
-		> Referenced Stand Alone SOP Inst. Seq for the grayscale softcopy presentation state objects	-	-	-	0040,0220
24		>> Referenced SOP Class UID	-	-	0008,0016	0008,1150
25		>> Referenced SOP Instance UID	-	-	0008,0018	0008,1155
26		> Series Protocol Name	-	-	0018,1030	0018,1030
27		> Series Description	-	-	0008,103E	0008,103E
28		> Series Instance UID	-	-	0020,000E	0020,000E

8.1.3. Coerced/Modified fields

The Network AE will only import MR images and Presentation State objects that were created on an MR System. These imported images may be coerced or modified and are to be used for reference only; it is not the intention to export them again.

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8.2. Data Dictionary of Private Attributes

Not Applicable.

8.3. Coded Terminology and Templates

Not Applicable.

8.3.1. Context Groups

Not Applicable.

8.3.2. Template Specifications

Not Applicable.

8.3.3. Private code definitions

Not Applicable.

8.4. Grayscale Image consistency

The display monitor of the MR system is calibrated according to the Grayscale Standard Display Function (GSDF).
As described in the object definitions the Presentation LUT shape (2050, 0020) is always IDENTITY.
Consequently receiving stations must be calibrated according the GSDF and use the standard DICOM P-LUT.

8.5. Standard Extended/Specialized/Private SOPs

The MR supports the following standard Specialized SOP classes.

Table 211: List of Standard Specialized SOP Classes.

SOP Class Name	SOP Class UID
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4

The following standard extensions are applied for the MR Image Storage SOP class. See also the overview of the applied MR Image IOD in section 8.1.1.

Table 212: Applied Standard Extentions.

IOD	Module	Note
MR Image	Patient Medical Module	-
MR Image	Study Classification Module	-
MR Image	Study Scheduling Module	-
MR Image	Requested Procedure Module	Additional attribute: Requested Contrast Agent
MR Image	Imaging Service Request Module	-
MR Image	Performed Procedure Step Information Module	-
MR Image	Billing and Material Management Code Module	-

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IOD	Module	Note
MR Image	General Series Module	Additional attributes in Referenced Performed Procedure Step Sequence: >Specific Character Set >Instance Creation Date >Instance Creation Time >Instance Creator UID >Instance Number
MR Image	Modality LUT Module	Present if configured. Must be applied when viewing the image.
MR Image	Private Group	Private MR attributes.
All storage	General Study Module	Additional attribute: Scheduled Performing Physician's Name

The MR System supports private SOP classes; for the C-STORE services these private SOP classes are listed in the following table.

Table 213: Supported Private SOP Classes as SCU and SCP.

SOP Class Name	UID
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4

Table 214: List of created SOP Classes

SOP Class Name	SOP Class UID
CT Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.2
Enhanced MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.1
Philips Private MR Series Data Storage	1.3.46.670589.11.0.0.12.2
Philips Private MR Spectrum Storage	1.3.46.670589.11.0.0.12.1
MR Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.4
MR Spectroscopy Storage SOP Class	1.2.840.10008.5.1.4.1.1.4.2
Raw Data Storage SOP Class	1.2.840.10008.5.1.4.1.1.66
Secondary Capture Image Storage SOP Class	1.2.840.10008.5.1.4.1.1.7
Grayscale Softcopy Presentation State Storage SOP Class	1.2.840.10008.5.1.4.1.1.11.1
Philips Private MR Examcard Storage	1.3.46.670589.11.0.0.12.4
Media Storage Directory SOP Class	1.2.840.10008.1.3.10

8.5.1. Standard Extended/Specialized/Private SOP Instance

8.5.1.1. CT Image Storage SOP Class

Table 215: Extended DICOM and private attributes for CT Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Conversion Type	0008,0064	CS		ANAP	COPY	
Code Value	0008,0100	SH		ANAP	COPY	
Coding Scheme Designator	0008,0102	SH		ANAP	COPY	
Code Meaning	0008,0104	LO		ANAP	COPY	
Medical Alerts	0010,2000	LO		ANAP	COPY	
Allergies	0010,2110	LO		ANAP	COPY	
Pregnancy Status	0010,21C0	US		ANAP	COPY	

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Scanning Sequence	0018,0020	CS		ANAP	COPY	
Sequence Variant	0018,0021	CS		ANAP	COPY	
MR Acquisition Type	0018,0023	CS		ANAP	COPY	
Sequence Name	0018,0024	SH		ANAP	COPY	
Repetition Time	0018,0080	DS		ANAP	COPY	
Echo Time	0018,0081	DS		ANAP	COPY	
Number Of Averages	0018,0083	DS		ANAP	COPY	
Imaging Frequency	0018,0084	DS		ANAP	COPY	
Imaged Nucleus	0018,0085	SH		ANAP	COPY	
Echo Numbers	0018,0086	IS		ANAP	COPY	
Magnetic Field Strength	0018,0087	DS		ANAP	COPY	
Spacing Between Slices	0018,0088	DS		ANAP	COPY	
Number Of Phase Encoding Steps	0018,0089	IS		ANAP	COPY	
Echo Train Length	0018,0091	IS		ANAP	COPY	
Percent Sampling	0018,0093	DS		ANAP	COPY	
Percent Phase Field Of View	0018,0094	DS		ANAP	COPY	
Pixel Bandwidth	0018,0095	DS		ANAP	COPY	
Secondary Capture Device ID	0018,1010	LO		ANAP	COPY	
Secondary Capture Device Manufacturer	0018,1016	LO		ANAP	COPY	
Secondary Capture Device Manufacturer Mo	0018,1018	LO		ANAP	COPY	
Secondary Capture Device Software Versio	0018,1019	LO		ANAP	COPY	
Video Image Format Acquired	0018,1022	SH		ANAP	COPY	
Digital Image Format Acquired	0018,1023	LO		ANAP	COPY	
Low R-R Value	0018,1081	IS		ANAP	COPY	
High R-R Value	0018,1082	IS		ANAP	COPY	
Intervals Acquired	0018,1083	IS		ANAP	COPY	
Intervals Rejected	0018,1084	IS		ANAP	COPY	
Heart Rate	0018,1088	IS		ANAP	COPY	
Receive Coil Name	0018,1250	SH		ANAP	COPY	
Transmit Coil Name	0018,1251	SH		ANAP	COPY	
Acquisition Matrix	0018,1310	US		ANAP	COPY	
In-plane Phase Encoding Direction	0018,1312	CS		ANAP	COPY	
Flip Angle	0018,1314	DS		ANAP	COPY	
SAR	0018,1316	DS		ANAP	COPY	
dB/dt	0018,1318	DS		ANAP	COPY	
Filter Material	0018,7050	CS		ANAP	COPY	
Acquisition Duration	0018,9073	FD		ANAP	COPY	
Diffusion b-value	0018,9087	FD		ANAP	COPY	
Diffusion Gradient Orientation	0018,9089	FD		ANAP	COPY	
X-Ray Tube Current In mA	0018,9330	FD		ANAP	COPY	
Temporal Position Identifier	0020,0100	IS		ANAP	COPY	
Number Of Temporal Positions	0020,0105	IS		ANAP	COPY	
Requesting Physician	0032,1032	PN		ANAP	COPY	
Requesting Service	0032,1033	LO		ANAP	COPY	
Requested Procedure Description	0032,1070	LO		ANAP	COPY	
Study Comments	0032,4000	LT		ANAP	COPY	
Special Needs	0038,0050	LO		ANAP	COPY	
Patient State	0038,0500	LO		ANAP	COPY	

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Scheduled Performing Physician's Name	0040,0006	PN		ANAP	COPY	
Performed Station AE Title	0040,0241	AE		ANAP	COPY	
Performed Station Name	0040,0242	SH		ANAP	COPY	
Performed Location	0040,0243	SH		ANAP	COPY	
Performed Procedure Step End Date	0040,0250	DA		ANAP	COPY	
Performed Procedure Step End Time	0040,0251	TM		ANAP	COPY	
Performed Procedure Step Status	0040,0252	CS		ANAP	COPY	
Performed Procedure Step ID	0040,0253	SH		ANAP	COPY	
Performed Procedure Type Description	0040,0255	LO		ANAP	COPY	
Requested Procedure ID	0040,1001	SH		ANAP	COPY	
Reason for the Requested Procedure	0040,1002	LO		ANAP	COPY	
Requested Procedure Priority	0040,1003	SH		ANAP	COPY	
Patient Transport Arrangements	0040,1004	LO		ANAP	COPY	
Requested Procedure Location	0040,1005	LO		ANAP	COPY	
Requested Procedure Comments	0040,1400	LT		ANAP	COPY	
Reason for the Imaging Service Request	0040,2001	LO		ANAP	COPY	
Issue Date of Imaging Service Request	0040,2004	DA		ANAP	COPY	
Issue Time of Imaging Service Request	0040,2005	TM		ANAP	COPY	
Order Enterer's Location	0040,2009	SH		ANAP	COPY	
Order Callback Phone Number	0040,2010	SH		ANAP	COPY	
Imaging Service Request Comments	0040,2400	LT		ANAP	COPY	
Acquisition Date Time	0008,002A	DT		ANAP	COPY	
Frame Type	0008,9007	CS		ANAP	COPY	
Creator-Version UID	0008,9123	UI		ANAP	COPY	
Pixel Presentation	0008,9205	CS		ANAP	COPY	
Volumetric Properties	0008,9206	CS		ANAP	COPY	
Volume Based Calculation Technique	0008,9207	CS		ANAP	COPY	
Complex Image Component	0008,9208	CS		ANAP	COPY	
Acquisition Contrast	0008,9209	CS		ANAP	COPY	
Pulse Sequence Name	0018,9005	SH		ANAP	COPY	
Echo Pulse Sequence	0018,9008	CS		ANAP	COPY	
Inversion Recovery	0018,9009	CS		ANAP	COPY	
Multiple Spin Echo	0018,9011	CS		ANAP	COPY	
Multi-planar Excitation	0018,9012	CS		ANAP	COPY	
Phase Contrast	0018,9014	CS		ANAP	COPY	
Time of Flight Contrast	0018,9015	CS		ANAP	COPY	
Spoiling	0018,9016	CS		ANAP	COPY	
Steady State Pulse Sequence	0018,9017	CS		ANAP	COPY	
Echo Planar Pulse Sequence	0018,9018	CS		ANAP	COPY	
Tag Angle First Axis	0018,9019	FD		ANAP	COPY	
Magnetization Transfer	0018,9020	CS		ANAP	COPY	
T2 Preparation	0018,9021	CS		ANAP	COPY	
Blood Signal Nulling	0018,9022	CS		ANAP	COPY	
Saturation Recovery	0018,9024	CS		ANAP	COPY	
Spectrally Selected Suppression	0018,9025	CS		ANAP	COPY	
Spectrally Selected Excitation	0018,9026	CS		ANAP	COPY	
Spatial Pre-saturation	0018,9027	CS		ANAP	COPY	
Tagging	0018,9028	CS		ANAP	COPY	

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Oversampling Phase	0018,9029	CS		ANAP	COPY	
Tag Spacing First Dimension	0018,9030	FD		ANAP	COPY	
Geometry of k-Space Traversal	0018,9032	CS		ANAP	COPY	
Segmented k-Space Traversal	0018,9033	CS		ANAP	COPY	
Rectilinear Phase Encode Reordering	0018,9034	CS		ANAP	COPY	
Tag Thickness	0018,9035	FD		ANAP	COPY	
Partial Fourier Direction	0018,9036	CS		ANAP	COPY	
Cardiac Synchronization Technique	0018,9037	CS		ANAP	COPY	
Receive Coil Manufacturer Name	0018,9041	LO		ANAP	COPY	
Receive Coil Type	0018,9043	CS		ANAP	COPY	
Quadrature Receive Coil	0018,9044	CS		ANAP	COPY	
Multi-Coil Element Name	0018,9047	SH		ANAP	COPY	
Multi-Coil Element Used	0018,9048	CS		ANAP	COPY	
Transmit Coil Manufacturer Name	0018,9050	LO		ANAP	COPY	
Transmit Coil Type	0018,9051	CS		ANAP	COPY	
Chemical Shift Reference	0018,9053	FD		ANAP	COPY	
MR Acquisition Frequency Encoding Steps	0018,9058	US		ANAP	COPY	
De-coupling	0018,9059	CS		ANAP	COPY	
De-coupled Nucleus	0018,9060	CS		ANAP	COPY	
De-coupling Method	0018,9062	CS		ANAP	COPY	
k-space Filtering	0018,9064	CS		ANAP	COPY	
Time Domain Filtering	0018,9065	CS		ANAP	COPY	
Parallel Reduction Factor In-plane	0018,9069	FD		ANAP	COPY	
Diffusion Directionality	0018,9075	CS		ANAP	COPY	
Parallel Acquisition	0018,9077	CS		ANAP	COPY	
Parallel Acquisition Technique	0018,9078	CS		ANAP	COPY	
Inversion Times	0018,9079	FD		ANAP	COPY	
Metabolite Map Description	0018,9080	ST		ANAP	COPY	
Partial Fourier	0018,9081	CS		ANAP	COPY	
Cardiac Signal Source	0018,9085	CS		ANAP	COPY	
Diffusion b-value	0018,9087	FD		ANAP	COPY	
Diffusion Gradient Orientation	0018,9089	FD		ANAP	COPY	
Velocity Encoding Direction	0018,9090	FD		ANAP	COPY	
Velocity Encoding Minimum Value	0018,9091	FD		ANAP	COPY	
Number of k-Space Trajectories	0018,9093	US		ANAP	COPY	
Coverage of k-Space	0018,9094	CS		ANAP	COPY	
Frequency Correction	0018,9101	CS		ANAP	COPY	
Diffusion Anisotropy Type	0018,9147	CS		ANAP	COPY	
Parallel Reduction Factor out-of-plane	0018,9155	FD		ANAP	COPY	
Parallel Reduction Factor Second In-plane	0018,9168	FD		ANAP	COPY	
Cardiac Beat Rejection Technique	0018,9169	CS		ANAP	COPY	
Respiratory Motion Compensation Technique	0018,9170	CS		ANAP	COPY	
Respiratory Signal Source	0018,9171	CS		ANAP	COPY	
Bulk Motion Compensation Technique	0018,9172	CS		ANAP	COPY	
Applicable Safety Standard Agency	0018,9174	CS		ANAP	COPY	
Operating Mode Sequence	0018,9176	SQ		ANAP	COPY	
Operating Mode Type	0018,9177	CS		ANAP	COPY	
Operating Mode	0018,9178	CS		ANAP	COPY	

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Specific Absorption Rate Definition	0018,9179	CS		ANAP	COPY	
Gradient Output Type	0018,9180	CS		ANAP	COPY	
Specific Absorption Rate Value	0018,9181	FD		ANAP	COPY	
Gradient Output	0018,9182	FD		ANAP	COPY	
Flow Compensation Direction	0018,9183	CS		ANAP	COPY	
Water Referenced Phase Correction	0018,9199	CS		ANAP	COPY	
MR Spectroscopy Acquisition Type	0018,9200	CS		ANAP	COPY	
MR Acquisition Phase Encoding Steps in-plane	0018,9231	US		ANAP	COPY	
MR Acquisition Phase Encoding Steps out-of-plane	0018,9232	US		ANAP	COPY	
RF Echo Train Length	0018,9240	US		ANAP	COPY	
Gradient Echo Train Length	0018,9241	US		ANAP	COPY	
Diffusion b-value XX	0018,9602	FD		ANAP	COPY	
Diffusion b-value XY	0018,9603	FD		ANAP	COPY	
Diffusion b-value XZ	0018,9604	FD		ANAP	COPY	
Diffusion b-value YY	0018,9605	FD		ANAP	COPY	
Diffusion b-value YZ	0018,9606	FD		ANAP	COPY	
Diffusion b-value ZZ	0018,9607	FD		ANAP	COPY	
Frame Laterality	0020,9072	CS		ANAP	COPY	
Respiratory Interval Time	0020,9254	FD		ANAP	COPY	
Nominal Respiratory Trigger Delay Time	0020,9255	FD		ANAP	COPY	
Respiratory Trigger Delay Threshold	0020,9256	FD		ANAP	COPY	
Data Point Rows	0028,9001	UL		ANAP	COPY	
Data Point Columns	0028,9002	UL		ANAP	COPY	
Signal Domain Columns	0028,9003	CS		ANAP	COPY	
Data Representation	0028,9108	CS		ANAP	COPY	
LUT Label	0040,9210	SH		ANAP	COPY	
KVP	0018,0060	DS		ANAP	COPY	
Data Collection Diameter	0018,0090	DS		ANAP	COPY	
Gantry/Detector Tilt	0018,1120	DS		ANAP	COPY	
Filter Type	0018,1160	SH		ANAP	COPY	
Focal Spots	0018,1190	DS		ANAP	COPY	
Filter Material	0018,7050	CS		ANAP	COPY	
X-Ray Tube Current In mA	0018,9330	FD		ANAP	COPY	
Position Reference Indicator	0020,1040	LO		ANAP	COPY	

8.5.1.2. Enhanced MR Image Storage SOP Class

Table 216: Extended DICOM and private attributes for Enhanced MR Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		ANAP	MWL, USER	-
Allergies	0010,2110	LO		ANAP	MWL, USER	-
Pregnancy Status	0010,21C0	US		VNAP	MWL, USER	-
Acquisition Duration	0018,9073	FD		ANAP	AUTO	-
Special Needs	0038,0050	LO		ANAP	MWL	Only present when patient demographics received from RIS.
Patient State	0038,0500	LO		ANAP	MWL	Only present when patient demographics received from RIS.

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Scheduled Performing Physician's Name	0040,0006	PN		VNAP	MWL	-
Private Creator Group 2005	2005,0014	LO		ANAP		Applied value: Philips MR Imaging DD 005
Private Creator Group 2005	2005,0015	LO		ALWAYS	AUTO	Applied value: Philips MR Imaging DD 006
Specific Energy Dose	2005,1492	FL		ALWAYS	AUTO	
MRE Frequency	2005,1553	FL		ANAP	AUTO	-
MRE Amplitude	2005,1554	FL		ANAP	AUTO	-
MREMEG Frequency	2005,1555	FL		ANAP	AUTO	-
MREMEG Pairs	2005,1556	FL		ANAP	AUTO	-
MREMEG Direction	2005,1557	CS		ANAP	AUTO	-
MREMEG Amplitude	2005,1558	FL		ANAP	AUTO	-
MRE Number of Phase Delays	2005,1559	FL		ANAP	AUTO	This parameter should be used as Integer although VR is specified and stored as Float
MRE Number of Motion Cycles	2005,1560	IS		ANAP	AUTO	-
MRE Motion Meg Phase Delay	2005,1561	FL		ANAP	AUTO	-
MRE Inversion Algorithm Version	2005,1562	LT		ANAP	AUTO	-
MRE Phase Delay Number	2005,1568	IS		ANAP	AUTO	-
Sagittal Slice Order	2005,1563	CS		ANAP	AUTO,COPY	-
Coronal Slice Order	2005,1564	CS		ANAP	AUTO,COPY	-
Transversal Slice Order	2005,1565	CS		ANAP	AUTO,COPY	-
Series Orientation	2005,1566	CS		ANAP	AUTO,COPY	-
MR Stack Reverse	2005,1567	IS		ANAP	AUTO,COPY	-
Orientation Mirror Flip	2005,1579	CS		ANAP	AUTO,COPY	-
Number Of Inversion Delays	2005,1571	IS		ANAP	AUTO,COPY	-
Inversion Delay Time	2005,1572	FL		ANAP	AUTO,COPY	-
Inversion Delay Number	2005,1573	IS		ANAP	AUTO,COPY	-
Max DB DT	2005,1574	DS		ANAP	AUTO,COPY	-
Max SAR	2005,1575	DS		ANAP	AUTO,COPY	-
PIIM_GRADIENT_SLEW_RATE	2005,1585	DS		ANAP	USER	
PIIM_MR_STUDY_B1RMS	2005,1587	DS		ANAP	USER	
SAR Type	2005,1576	LT		ANAP	AUTO,COPY	-
Metal Implant Status	2005,1578	CS		ANAP	AUTO,COPY	-
SAR Operation Mode	2005,1581	CS		ANAP	AUTO,COPY	-
Spatial Gradient	2005,1582	IS		ANAP	AUTO,COPY	-
Additional Constraints	2005,1583	LT		ANAP	AUTO,COPY	-

8.5.1.3. MR Image Storage SOP Class

Table 217: Extended DICOM and private attributes for MR Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Image Sequence	0008,9124	SQ		ANAP	AUTO	-
>Source Image Sequence	0008,2112	SQ		ALWAYS	AUTO	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-

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>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Derivation Code Sequence	0008,9215	SQ		ALWAYS	AUTO	-
>>Code Value	0008,0100	SH		ALWAYS	AUTO	From CID 7203
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	From CID 7203
>>Coding Scheme Version	0008,0103	SH		ANAP	AUTO	From CID 7203
>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	From CID 7203
Medical Alerts	0010,2000	LO		ANAP	MWL, USER	-
Allergies	0010,2110	LO		ANAP	MWL, USER	-
Pregnancy Status	0010,21C0	US		VNAP	MWL, USER	-
Acquisition Duration	0018,9073	FD		ANAP	AUTO	-
Diffusion b-value	0018,9087	FD		ANAP	AUTO	-
Diffusion Gradient Orientation	0018,9089	FD		ANAP	AUTO	-
Rescale Intercept	0028,1052	DS		ALWAYS	AUTO	When a value is present and not 0, then this value shall be used in the scaling calculation for the correct Window setting.
Rescale Slope	0028,1053	DS		ALWAYS	AUTO	When a value is present and not 0, then this value shall be used in the scaling calculation for the correct Window setting.
Rescale Type	0028,1054	LO	normalized, US, cm/s, mrad, ms, mm^2/s, s,%,/s, S/m, kPa, mmol, ppm, Hz, um^2/sec, 10^-3 mm^2/s	ALWAYS	AUTO	no units, no units, cm/s, milliradian, ms, mm^2/s, s,%,/s, S/m, kPa, millimol, parts per million, Hz, um^2/s, mm^2/s
Requesting Physician	0032,1032	PN		VNAP	MWL	-
Requesting Service	0032,1033	LO		VNAP	MWL	-
Requested Procedure Description	0032,1060	LO		VNAP	MWL	-
Requested Contrast Agent	0032,1070	LO		VNAP	MWL	-
Study Comments (retired)	0032,4000	LT		VNAP	COPY	Maximally 32 characters copied from (0040,0280) Comments on the Performed Procedure Steps.
Special Needs	0038,0050	LO		ANAP	MWL	Only present when patient demographics received from RIS.
Patient State	0038,0500	LO		ANAP	MWL	Only present when patient demographics received from RIS.
Scheduled Performing Physician's Name	0040,0006	PN		VNAP	MWL	-
Performed Station AE Title	0040,0241	AE		ALWAYS	CONFIG	-
Performed Station Name	0040,0242	SH		ANAP	CONFIG	-
Performed Location	0040,0243	SH		ANAP	CONFIG	-
Performed Procedure Step End Date	0040,0250	DA		VNAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		VNAP	AUTO	-
Performed Procedure Step Status	0040,0252	CS		ANAP	IMPLICIT	if MPPS applied
Film Consumption Sequence	0040,0321	SQ		EMPTY	AUTO	-

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Requested Procedure ID	0040,1001	SH		VNAP	MWL	-
Reason for the Requested Procedure	0040,1002	LO		VNAP	MWL	-
Requested Procedure Priority	0040,1003	SH		VNAP	MWL	-
Patient Transport Arrangements	0040,1004	LO		VNAP	MWL	-
Requested Procedure Location	0040,1005	LO		VNAP	MWL	-
Requested Procedure Comments	0040,1400	LT		VNAP	MWL	-
Reason for the Imaging Service Request (retired)	0040,2001	LO		VNAP	MWL	-
Issue Date of Imaging Service Request	0040,2004	DA		VNAP	MWL	-
Issue Time of Imaging Service Request	0040,2005	TM		VNAP	MWL	-
Order Enterer's Location	0040,2009	SH		VNAP	MWL	-
Order Callback Phone Number	0040,2010	SH		VNAP	MWL	-
Imaging Service Request Comments	0040,2400	LT		VNAP	MWL	-
Real World Value Mapping Sequence	0040,9096	SQ		ALWAYS	AUTO	-
>Real World Value Intercept	0040,9224	FD		ALWAYS	AUTO	-
>Real World Value Slope	0040,9225	FD		ALWAYS	AUTO	-
Private Creator Group 2001	2001,0010	LO		ALWAYS	FIXED	Applied value: Philips Imaging DD 001
Chemical Shift	2001,1001	FL		ANAP	USER	Only applicable for spectro 2dsi.
Chemical Shift Number MR	2001,1002	IS		ANAP	IMPLICIT	Only applicable for spectro 2dsi.
Diffusion B-Factor	2001,1003	FL		ANAP	USER	Only applicable for spectro 2dsi.
Diffusion Direction	2001,1004	CS		ANAP	USER	Possible values:P (Preparation Direction), M (Measurement Direction),S (Selection Direction),O (Oblique Direction),I (Isotropic),Only applicable for diffusion scans.
Image Enhanced	2001,1006	CS		VNAP	IMPLICIT, USER	-
Image Type ED ES	2001,1007	CS		VNAP	IMPLICIT, USER	-
Phase Number	2001,1008	IS		VNAP	IMPLICIT	When cardiac synchronization used.
Image Prepulse Delay	2001,1009	FL		ALWAYS	AUTO	-
Slice Number MR	2001,100A	IS		VNAP	IMPLICIT, USER	-
Slice Orientation	2001,100B	CS		ALWAYS	MWL, USER	-
Arrhythmia Rejection	2001,100C	CS		ALWAYS	AUTO	-
Cardiac Cycled	2001,100E	CS		ALWAYS	AUTO	-
Cardiac Gate Width	2001,100F	SS		ALWAYS	AUTO	-
Cardiac Sync	2001,1010	CS		ALWAYS	AUTO	-
Diffusion Echo Time	2001,1011	FL		ANAP	IMPLICIT	Only applicable for diffusion scans.
Dynamic Series	2001,1012	CS		VNAP	USER	-
EPI Factor	2001,1013	SL		ALWAYS	IMPLICIT, USER	-
Number of Echoes	2001,1014	SL		VNAP	USER	-
Number of Locations	2001,1015	SS		VNAP	IMPLICIT, USER	-

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Number of PC Directions	2001,1016	SS		VNAP	USER	-
Number of Phases MR	2001,1017	SL		VNAP	IMPLICIT, USER	-
Number of Slices MR	2001,1018	SL		VNAP	IMPLICIT, USER	-
Partial Matrix Scanned	2001,1019	CS		VNAP	IMPLICIT, USER	-
PC Velocity	2001,101A	FL		ALWAYS	IMPLICIT, USER	-
Prepulse Delay	2001,101B	FL		VNAP	IMPLICIT, USER	-
Prepulse Type	2001,101C	CS		VNAP	USER	-
Reconstruction Number MR	2001,101D	IS		VNAP	IMPLICIT	-
Respiration Sync	2001,101F	CS		VNAP	USER	-
Scanning Technique	2001,1020	LO		ALWAYS	AUTO	-
SPIR	2001,1021	CS		VNAP	USER	-
Water Fat Shift	2001,1022	FL		VNAP	IMPLICIT, USER	-
Flip Angle Philips	2001,1023	DS		ALWAYS	IMPLICIT, USER	-
Series is Interactive	2001,1024	CS		VNAP	USER	-
Echo Time Display	2001,1025	SH		VNAP	USER	-
Contrast Transfer Taste	2001,1058	UL		ALWAYS	IMPLICIT	-
Number of Stacks	2001,1060	SL		VNAP	USER	-
Series Transmitted	2001,1061	CS		VNAP	AUTO	-
acquisition_no	2001,107B	IS		ALWAYS	IMPLICIT	-
no_dynamic_scans	2001,1081	IS		VNAP	IMPLICIT, USER	-
IsrawImage	2001,10A1	CS		ANAP	AUTO	-
Prospective Motion Correction	2001,10F1	FL		ANAP	AUTO	Only applicable if retrospective correction is done on the data.
Retrospective Motion Correction	2001,10F2	FL		ANAP	AUTO	Only applicable if retrospective correction is done on the data.
Private Creator Group 2005	2005,0010	LO		ALWAYS	FIXED	Applied value: Philips MR Imaging DD 001
Number of Chemical Shift	2005,1020	SL		ANAP	USER	Only applicable for spectro 2dsi.
Syncra Scan Type	2005,10A1	CS		ANAP	USER	If syncra scan. Applied values: SENSE, SYN_CLASSIC, SYN_COCA
Diffusion Direction RL	2005,10B0	FL		ANAP	AUTO	Only applicable if Diffusion Direction is Oblique.
Diffusion Direction AP	2005,10B1	FL		ANAP	AUTO	Only applicable if Diffusion Direction is Oblique.
Diffusion Direction FH	2005,10B2	FL		ANAP	AUTO	Only applicable if Diffusion Direction is Oblique.
Private Creator Group 2005	2005,0014	LO		ANAP		Applied value: Philips MR Imaging DD 005
Private Creator Group 2005	2005,0015	LO		ALWAYS	AUTO	Applied value: Philips MR Imaging DD 006
Specific Energy Dose	2005,1492	FL		ALWAYS	AUTO	
MRE Frequency	2005,1553	FL		ANAP	AUTO	-
MRE Amplitude	2005,1554	FL		ANAP	AUTO	-
MREMEG Frequency	2005,1555	FL		ANAP	AUTO	-
MREMEG Pairs	2005,1556	FL		ANAP	AUTO	-
MREMEG Direction	2005,1557	CS		ANAP	AUTO	-
MREMEG Amplitude	2005,1558	FL		ANAP	AUTO	-

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MRE Number of Phase Delays	2005,1559	FL		ANAP	AUTO	This parameter should be used as Integer although VR is specified and stored as Float
MRE Number of Motion Cycles	2005,1560	IS		ANAP	AUTO	-
MRE Motion Meg Phase Delay	2005,1561	FL		ANAP	AUTO	-
MRE Inversion Algorithm Version	2005,1562	LT		ANAP	AUTO	-
MRE Phase Delay Number	2005,1568	IS		ANAP	AUTO	-
Sagittal Slice Order	2005,1563	CS		ANAP	AUTO,COPY	-
Coronal Slice Order	2005,1564	CS		ANAP	AUTO,COPY	-
Transversal Slice Order	2005,1565	CS		ANAP	AUTO,COPY	-
Series Orientation	2005,1566	CS		ANAP	AUTO,COPY	-
MR Stack Reverse	2005,1567	IS		ANAP	AUTO,COPY	-
Orientation Mirror Flip	2005,1579	CS		ANAP	AUTO,COPY	-
Number Of Inversion Delays	2005,1571	IS		ANAP	AUTO,COPY	-
Inversion Delay Time	2005,1572	FL		ANAP	AUTO,COPY	-
Inversion Delay Number	2005,1573	IS		ANAP	AUTO,COPY	-
Max DB DT	2005,1574	DS		ANAP	AUTO,COPY	-
Max SAR	2005,1575	DS		ANAP	AUTO,COPY	-
PIIM_GRADIENT_SLEW_RATE	2005,1585	DS		ANAP	USER	
PIIM_MR_STUDY_B1RMS	2005,1587	DS		ANAP	USER	
SAR Type	2005,1576	LT		ANAP	AUTO,COPY	-
Metal Implant Status	2005,1578	CS		ANAP	AUTO,COPY	-
SAR Operation Mode	2005,1581	CS		ANAP	AUTO,COPY	-
Spatial Gradient	2005,1582	IS		ANAP	AUTO,COPY	-
Additional Constraints	2005,1583	LT		ANAP	AUTO,COPY	-

8.5.1.4. MR Spectroscopy Storage SOP Class

Table 218: Extended DICOM and private attributes for MR Spectroscopy Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Derivation Image Sequence	0008,9124	SQ		ANAP	AUTO	-
>Source Image Sequence	0008,2112	SQ		ALWAYS	AUTO	-
>>Referenced SOP Class UID	0008,1150	UI		ALWAYS	AUTO	-
>>Referenced SOP Instance UID	0008,1155	UI		ALWAYS	AUTO	-
>Derivation Code Sequence	0008,9215	SQ		ALWAYS	AUTO	-
>>Code Value	0008,0100	SH		ALWAYS	AUTO	from CID 7203
>>Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	from CID 7203
>>Coding Scheme Version	0008,0103	SH		ANAP	AUTO	from CID 7203
>>Code Meaning	0008,0104	LO		ALWAYS	AUTO	from CID 7203
Medical Alerts	0010,2000	LO		ANAP	AUTO, USER	-
Allergies	0010,2110	LO		ANAP	COPY, MWL, USER	-
Pregnancy Status	0010,21C0	US		VNAP	MWL, USER	-
Special Needs	0038,0050	LO		ANAP	MWL	Only present when patient demographics received from RIS.
Patient State	0038,0500	LO		ANAP	MWL	Only present when patient demographics received from RIS.
Scheduled Performing Physician's Name	0040,0006	PN		VNAP	AUTO, MWL	-

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Private Creator Group 2005	2005,0015	LO		ALWAYS	AUTO	Applied value: Philips MR Imaging DD 006
MRE Frequency	2005,1553	FL		ANAP	AUTO	-
MRE Amplitude	2005,1554	FL		ANAP	AUTO	-
MREMEG Frequency	2005,1555	FL		ANAP	AUTO	-
MREMEG Pairs	2005,1556	FL		ANAP	AUTO	-
MREMEG Direction	2005,1557	CS		ANAP	AUTO	-
MREMEG Amplitude	2005,1558	FL		ANAP	AUTO	-
MRE Number of Phase Delays	2005,1559	FL		ANAP	AUTO	This parameter should be used as Integer although VR is specified and stored as Float
MRE Number of Motion Cycles	2005,1560	IS		ANAP	AUTO	-
MRE Motion Meg Phase Delay	2005,1561	FL		ANAP	AUTO	-
MRE Inversion Algorithm Version	2005,1562	LT		ANAP	AUTO	-
MRE Phase Delay Number	2005,1568	IS		ANAP	AUTO	-
Sagittal Slice Order	2005,1563	CS		ANAP	AUTO,COPY	-
Coronal Slice Order	2005,1564	CS		ANAP	AUTO,COPY	-
Transversal Slice Order	2005,1565	CS		ANAP	AUTO,COPY	-
Series Orientation	2005,1566	CS		ANAP	AUTO,COPY	-
MR Stack Reverse	2005,1567	IS		ANAP	AUTO,COPY	-
Orientation Mirror Flip	2005,1579	CS		ANAP	AUTO,COPY	-
Number Of Inversion Delays	2005,1571	IS		ANAP	AUTO,COPY	-
Inversion Delay Time	2005,1572	FL		ANAP	AUTO,COPY	-
Inversion Delay Number	2005,1573	IS		ANAP	AUTO,COPY	-
Max DB DT	2005,1574	DS		ANAP	AUTO,COPY	-
Max SAR	2005,1575	DS		ANAP	AUTO,COPY	-
PIIM_GRADIENT_SLEW_RATE	2005,1585	DS		ANAP	USER	
PIIM_MR_STUDY_B1RMS	2005,1587	DS		ANAP	USER	
SAR Type	2005,1576	LT		ANAP	AUTO,COPY	-
Metal Implant Status	2005,1578	CS		ANAP	AUTO,COPY	-
SAR Operation Mode	2005,1581	CS		ANAP	AUTO,COPY	-
Spatial Gradient	2005,1582	IS		ANAP	AUTO,COPY	-
Additional Constraints	2005,1583	LT		ANAP	AUTO,COPY	-

8.5.1.5. Raw Data Storage SOP Class

Table 219: Extended DICOM and private attributes for Raw Data Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Code Value	0008,0100	SH		VNAP	AUTO	-
Coding Scheme Designator	0008,0102	SH		ALWAYS	AUTO	-
Code Meaning	0008,0104	LO		VNAP	AUTO	-
Pixel Presentation	0008,9205	CS		ALWAYS	AUTO	MONOCHROME
Volumetric Properties	0008,9206	CS		ALWAYS	AUTO	-
Volume Based Calculation Technique	0008,9207	CS		ALWAYS	AUTO	-
Medical Alerts	0010,2000	LO		ANAP	AUTO	-
Allergies	0010,2110	LO		ANAP	COPY	-
Pregnancy Status	0010,21C0	US		VNAP	COPY	-
Pixel Bandwidth	0018,0095	DS		ALWAYS	AUTO	-
Pulse Sequence Name	0018,9005	SH		ALWAYS	AUTO	-

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Echo Pulse Sequence	0018,9008	CS		ALWAYS	AUTO	-
Multiple Spin Echo	0018,9011	CS		ALWAYS	AUTO	-
Multi-planar Excitation	0018,9012	CS		ALWAYS	AUTO	-
Phase Contrast	0018,9014	CS		ALWAYS	AUTO	-
Time of Flight Contrast	0018,9015	CS		ALWAYS	AUTO	-
Spoiling	0018,9016	CS		ALWAYS	AUTO	-
Steady State Pulse Sequence	0018,9017	CS		ALWAYS	AUTO	-
Echo Planar Pulse Sequence	0018,9018	CS		ALWAYS	AUTO	-
Magnetization Transfer	0018,9020	CS		ALWAYS	AUTO	-
T2 Preparation	0018,9021	CS		ALWAYS	AUTO	-
Blood Signal Nulling	0018,9022	CS		ALWAYS	AUTO	-
Saturation Recovery	0018,9024	CS		ALWAYS	AUTO	-
Spectrally Selected Suppression	0018,9025	CS		ALWAYS	AUTO	-
Spatial Pre-saturation	0018,9027	CS		ALWAYS	AUTO	-
Tagging	0018,9028	CS		ALWAYS	AUTO	-
Oversampling Phase	0018,9029	CS		ALWAYS	AUTO	-
Geometry of k-Space Traversal	0018,9032	CS		ALWAYS	AUTO	-
Segmented k-Space Traversal	0018,9033	CS		ALWAYS	AUTO	-
Rectilinear Phase Encode Reordering	0018,9034	CS		ALWAYS	AUTO	-
Tag Thickness	0018,9035	FD		ALWAYS	AUTO	-
Partial Fourier Direction	0018,9036	CS		ALWAYS	AUTO	-
Cardiac Synchronization Technique	0018,9037	CS		ALWAYS	AUTO	-
Transmit Coil Type	0018,9051	CS		ALWAYS	AUTO	-
Chemical Shift Reference	0018,9053	FD		ALWAYS	AUTO	-
MR Acquisition Frequency Encoding Steps	0018,9058	US		ALWAYS	AUTO	-
Velocity Encoding Direction	0018,9090	FD		ALWAYS	AUTO	-
Velocity Encoding Minimum Value	0018,9091	FD		ALWAYS	AUTO	-
Number of k-Space Trajectories	0018,9093	US		ALWAYS	AUTO	-
Frequency Correction	0018,9101	CS		ALWAYS	AUTO	-
Parallel Reduction Factor out-of-plane	0018,9155	FD		ALWAYS	AUTO	-
Parallel Reduction Factor Second In-plane	0018,9168	FD		ALWAYS	AUTO	-
Respiratory Motion Compensation Technique	0018,9170	CS		ALWAYS	AUTO	-
Respiratory Signal Source	0018,9171	CS		ALWAYS	AUTO	-
Bulk Motion Compensation Technique	0018,9172	CS		ALWAYS	AUTO	-
Applicable Safety Standard Agency	0018,9174	CS		ALWAYS	AUTO	-
Specific Absorption Rate Definition	0018,9179	CS		ALWAYS	AUTO	-
Gradient Output Type	0018,9180	CS		ALWAYS	AUTO	-
Specific Absorption Rate Value	0018,9181	FD		ALWAYS	AUTO	-
Gradient Output	0018,9182	FD		ALWAYS	AUTO	-
Water Referenced Phase Correction	0018,9199	CS		ALWAYS	AUTO	-

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MR Spectroscopy Acquisition Type	0018,9200	CS		VNAP	AUTO	-
MR Acquisition Phase Encoding Steps in-plane	0018,9231	US		ALWAYS	AUTO	-
RF Echo Train Length	0018,9240	US		ALWAYS	AUTO	-
Gradient Echo Train Length	0018,9241	US		ALWAYS	AUTO	-
Frame Laterality	0020,9072	CS		ALWAYS	AUTO	-
Respiratory Interval Time	0020,9254	FD		ALWAYS	AUTO	-
Nominal Respiratory Trigger Delay Time	0020,9255	FD		ALWAYS	AUTO	-
Number of Frames	0028,0008	IS		ALWAYS	AUTO	-
LUT Explanation	0028,3003	LO		ALWAYS	AUTO	Philips Real World Value Mapping
Data Point Rows	0028,9001	UL		ALWAYS	AUTO	-
Data Point Columns	0028,9002	UL		ALWAYS	AUTO	-
Requesting Physician	0032,1032	PN		ALWAYS	AUTO	-
Requesting Service	0032,1033	LO		ALWAYS	AUTO	-
Requested Procedure Description	0032,1060	LO		ALWAYS	AUTO	-
Study Comments (retired)	0032,4000	LT		ALWAYS	AUTO	Comments added on MR
Special Needs	0038,0050	LO		ANAP	AUTO	-
Patient State	0038,0500	LO		ANAP	AUTO	-
Scheduled Performing Physician's Name	0040,0006	PN		VNAP	AUTO	-
Performed Station AE Title	0040,0241	AE		ALWAYS	AUTO	-
Performed Procedure Step End Date	0040,0250	DA		ALWAYS	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ALWAYS	AUTO	-
Performed Procedure Step Status	0040,0252	CS		ALWAYS	AUTO	
Film Consumption Sequence	0040,0321	SQ		EMPTY	AUTO	-
Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO	-
Requested Procedure Comments	0040,1400	LT		ALWAYS	AUTO	-
Imaging Service Request Comments	0040,2400	LT		ALWAYS	AUTO	-
LUT Label	0040,9210	SH		ALWAYS	AUTO	-
Private Creator Group 2001	2001,0010	LO		ALWAYS	AUTO	
Private Creator Group 2005 4	2005,0013	LO		ALWAYS	AUTO	
Private Creator Group 2005 (14)	2005,0014	LO		ALWAYS	AUTO	
Private Creator Group 2005	2005,0015	LO		ALWAYS	AUTO	Applied value: Philips MR Imaging DD 006
MIP protocol	2005,101E	SH		ALWAYS	AUTO	-
MPR Protocol	2005,101F	SH		ALWAYS	AUTO	-

8.5.1.6. Secondary Capture Image Storage SOP Class

Table 220: Extended DICOM and private attributes for Secondary Capture Image Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		ANAP	COPY	-
Allergies	0010,2110	LO		ANAP	COPY	-
Pregnancy Status	0010,21C0	US		VNAP	COPY	-

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Special Needs	0038,0050	LO		ANAP	COPY	-
Patient State	0038,0500	LO		ANAP	COPY	-
Scheduled Performing Physician's Name	0040,0006	PN		ANAP	MWL	-
Performed Station AE Title	0040,0241	AE		ALWAYS	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ALWAYS	AUTO	-
Comments on the Performed Procedure Step	0040,0280	ST		ALWAYS	AUTO	-
Film Consumption Sequence	0040,0321	SQ		EMPTY	AUTO	-
Private Creator Group 2001	2001,0010	LO		ALWAYS	AUTO	-
Series Transmitted	2001,1061	CS		ALWAYS	AUTO	-
Series Committed	2001,1062	CS		ALWAYS	AUTO	-
Examination Source	2001,1063	CS		ALWAYS	AUTO	-

8.5.1.7. Grayscale Softcopy Presentation State Storage SOP Class

Table 221: Extended DICOM and private attributes for Grayscale Softcopy Presentation State Storage SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Medical Alerts	0010,2000	LO		ANAP	COPY	-
Allergies	0010,2110	LO		ANAP	COPY	-
Pregnancy Status	0010,21C0	US		VNAP	COPY	-
Requesting Physician	0032,1032	PN		VNAP	COPY	-
Requesting Service	0032,1033	LO		VNAP	COPY	-
Requested Procedure Description	0032,1060	LO		ALWAYS	AUTO	-
Study Comments (retired)	0032,4000	LT		ANAP	AUTO, USER	Comments added on MR
Special Needs	0038,0050	LO		ANAP	COPY	-
Patient State	0038,0500	LO		ANAP	COPY	-
Scheduled Performing Physician's Name	0040,0006	PN		ANAP	AUTO	-
Performed Procedure Step End Time	0040,0251	TM		ALWAYS	AUTO	-
Performed Procedure Step Status	0040,0252	CS		ALWAYS	AUTO	-
Requested Procedure ID	0040,1001	SH		ALWAYS	AUTO	-
Requested Procedure Comments	0040,1400	LT		ALWAYS	MWL, USER	-
Imaging Service Request Comments	0040,2400	LT		ALWAYS	MWL, USER	-
Private Creator Group 2001	2001,0010	LO		ALWAYS	AUTO	-
Private Creator Group 2001 (90)	2001,0090	LO		ALWAYS	AUTO	-
Presentation State Subtraction Active	2001,1026	CS		ALWAYS	AUTO	-
Series Transmitted	2001,1061	CS		ALWAYS	AUTO	-
Series Committed	2001,1062	CS		ALWAYS	AUTO	-
Examination Source	2001,1063	CS		ALWAYS	AUTO	-
LinearPresentationGLTrafoshapesub	2001,1067	CS		VNAP	AUTO	-
GL TrafoType	2001,1077	CS		ALWAYS	AUTO	-
Pixel Processing Kernel Size	2001,109F	US		ALWAYS	AUTO	-

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8.5.1.8. Media Storage Directory SOP Class

Table 222: Extended DICOM and private attributes for Media Storage Directory SOP Class Instances

Attribute Name	Tag	VR	Value	Presence of Value	Source	Comment
Private Creator Group 2001	2001,0010	LO		ALWAYS	AUTO	-
Number of Echoes	2001,1014	SL		VNAP	COPY	-
Number of Phases MR	2001,1017	SL		VNAP	COPY	-
Number of Slices MR	2001,1018	SL		VNAP	COPY	-
Reconstruction Number MR	2001,101D	IS		VNAP	COPY	-
Scanning Technique	2001,1020	LO		VNAP	COPY	-
Echo Time Display	2001,1025	SH		VNAP	COPY	-
Stack Sequence	2001,105F	SQ		VNAP	COPY	-
>Number of Stack Slices	2001,102D	SS		VNAP	COPY	-
>Stack Radial Angle	2001,1032	FL		VNAP	COPY	-
>Stack Radial Axis	2001,1033	CS		VNAP	COPY	-
>Stack Slice Number	2001,1035	SS		VNAP	COPY	-
>Stack Type	2001,1036	CS		VNAP	COPY	-
Examination Source	2001,1063	CS		VNAP	COPY	-
Private Creator Group 2005	2005,0010	LO		ALWAYS	AUTO	-
Number of Chemical Shift	2005,1020	SL		VNAP	COPY	-
Syncra Scan Type	2005,10A1	CS		VNAP	COPY	-

8.6. Private Transfer Syntaxes

The MR System does not support any private transfer syntaxes.

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